Railway
Engineering and
Maintenance
THE CHICAGO
GREAT WESTERN
FORT DODGE VIADUCT
This is one of the largest viaducts in Iowa and was completed in 1902. It crosses the Des Moines River, the Illinois Central Railroad, the M. and St. L. Railroad and five highways. Great Western's fleet of diesel powered fast freights are high geared and streamlined for freight—a vital link in America's vast railway network.

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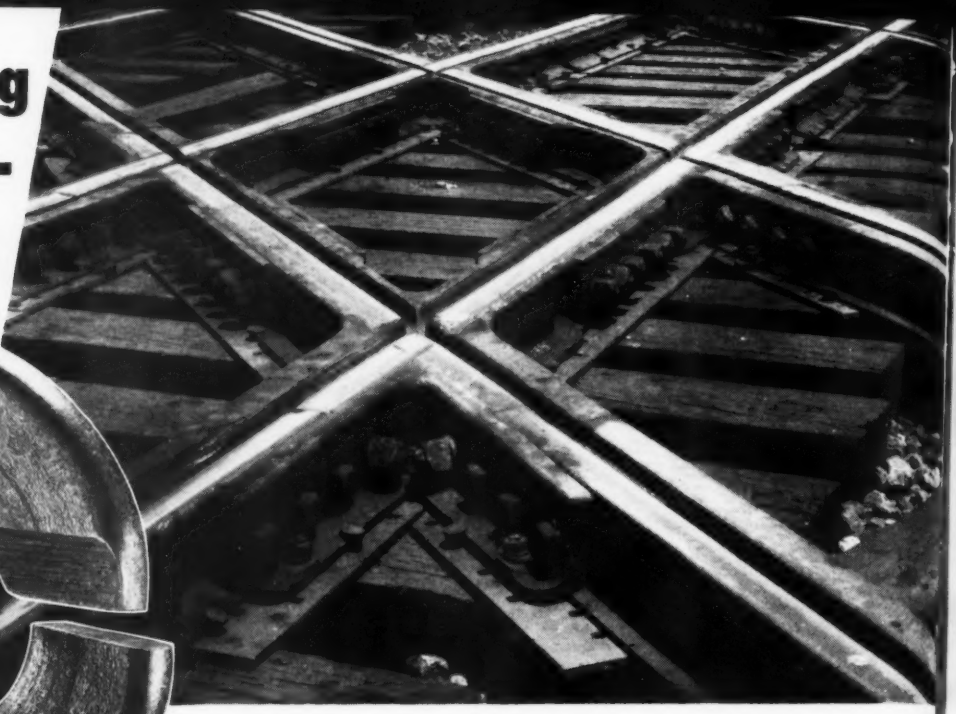
AGO • NEW YORK • DENVER • WASHINGTON • ST. LOUIS • CLEVELAND • ST. PAUL • BOSTON • SAN FRANCISCO
MEXICO D. F.

cost-reducing .....service-improving..

(reading time: 1 minute)



IMPROVED RELIANCE FROG and CROSSING HY-CROME SPRING WASHERS

fill a long-felt need

Improved Reliance Frog and Crossing Hy-Crome Spring Washers have been developed specifically for frog and crossing application, providing adequate protection from looseness of bolted parts resulting from wear. To achieve this, range of reaction together with reactive pressures have been developed through laboratory experiments and actual service tests. The design provides the nut with the necessary bearing surface, and ground deflected ends make reapplication possible without damaging the contacting parts. Important tension is maintained by providing the necessary range of recovery between maintenance periods. When these washers are correctly installed, an equal bolt tension is obtainable.

For many years maintaining tight bolts in frogs and crossings has presented a difficult problem. While spring washers in general have been of considerable help in meeting these conditions, it has been emphasized by experienced Track Maintenance Engineers how valuable it would be to have available a specially designed spring washer which would more completely meet their requirements. Improved Reliance Frog and Crossing Hy-Crome Spring Washers were especially designed to meet these requirements. Their automatic mechanical action and helical form will only flatten at a sufficient predetermined applied load. Wide range of reaction and adequate pressure provides tension, pending maintenance tightenings. This tension is constantly functioning, helping to eliminate failures occurring from service wear of bolted parts.

Available in sizes for 1⅛", 1¼", 1⅜" and 1½" thread diameter bolts, Improved Reliance Frog and Crossing Hy-Crome Spring Washers have been thoroughly tested in service. Our engineers will appreciate an opportunity to supply additional data and discuss an installation with you at your convenience.

EATON

EATON MANUFACTURING COMPANY

EATON **RELIANCE DIVISION, MASSILLON, OHIO**

Sales Offices: New York, Cleveland, Detroit, Chicago, St. Louis, San Francisco, Montre

MODEL 51 NEW CENTURY

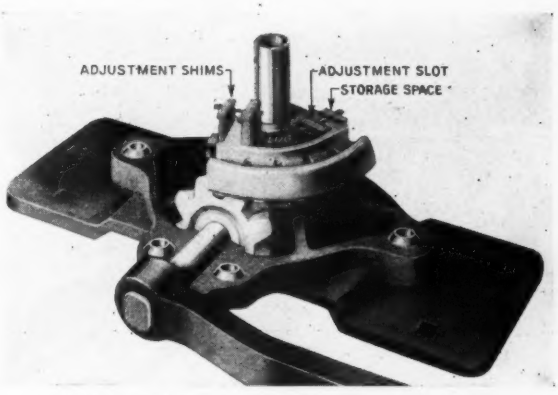
The stand that takes the nuisance out of switch-point adjustment

One of the best-liked features of our Model 51 New Century stand is the way it facilitates switch-point adjustment. The 51 has a simple adjusting device within the stand itself—a device that can be reached merely by pushing aside an outer cover. Then the operator has only to loosen two nuts and add or remove shims furnished with the stand; this increases or decreases the throw of the switch points.

Easy! Quick and effective, too. And far more convenient than ordinary methods of adjustment.

This feature is optional, and is included only on the Model 51. For railroads preferring a nonadjustable stand, Bethlehem furnishes another type—the Model 50. Both are available in low and intermediate designs. Both have the same smooth action, the same sturdy gearing, the same parallel throw.

Whichever you choose, you'll have a stand that's unsurpassed in heavy-duty service. Use it with big rail, 60-lb and up—in main lines, branch lines, yards.



Model 51 with housing removed to show adjusting device.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

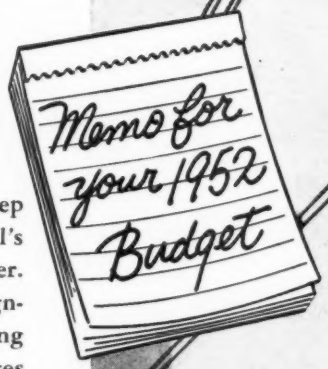
★ BETHLEHEM STEEL ★

Published monthly by Simmons-Boardman Publishing Corporation, 70 W. Monroe St., Chicago 3, Ill. Subscription price: United States and Possessions, and Canada, $2.00 for one year; $3.00 for two years. Single copies 50 cents. Entered as second-class matter January 20, 1933, at the post office at Chicago, Ill., under the act of March 3, 1879, with additional entry at Marion, Ind., post office. Address communications to 70 W. Monroe St., Chicago 3, Ill. Volume 47, No. 7.

G-E SNOWMELTERS SAVE HARD-TO-GET MANPOWER

Approximately 200 G-E Calrod* snowmelters keep the switches of the Cleveland Union Terminal's twelve main line tracks open during the winter. These switch heaters eliminate the need for assigning a man to each switch around-the-clock during freezing weather. Plan now to get the advantages of G-E snowmelters for the winter of '52 by asking your G-E representative now for details on how they can save money and valuable manpower for you. *General Electric Company, Schenectady 5, New York.*

*Reg. U.S. Pat. Off.

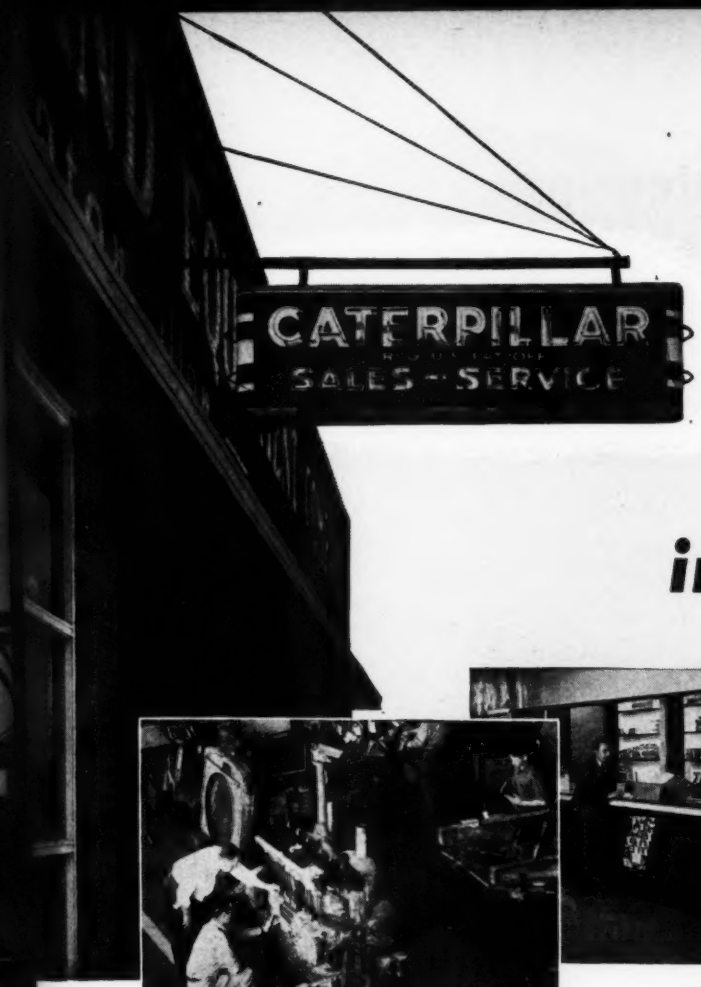


Shop Motors and Control • Shop Testing Equipment • Undercar Power Plants • Lighting Systems • Electric Heaters • Signal Power Systems • Power Distribution Systems • Electric and Diesel-Electric Locomotives

You can put your confidence in—

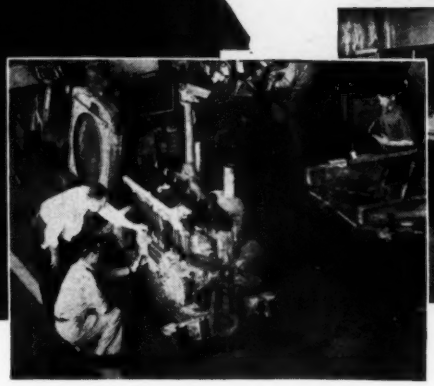
GENERAL ELECTRIC

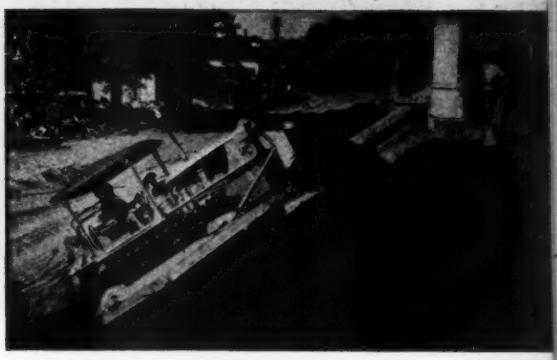
152-21



Your strong right arm...

in time of need





BECAUSE of the vast defense mobilization program, material shortages and extra production demands have gripped the nation. They affect particularly the heavy industries and the distributors and users of their products. And huge as America's facilities have become in recent years, they still are not large enough to keep pace with both military and civilian needs.

Nevertheless, as an owner of "Caterpillar" products, you are among the more fortunate. Your "Cat" equipment has been built for long life and to withstand severe working conditions. What's more, it is backed by a dealer organization that is world-famous for experience, accessibility, mechanical facilities and field service to keep you going "come hell or high water."

Since World War II, the already large number of "Caterpillar" sales-and-service establishments has increased greatly. Also since that time, "Caterpillar" and its dealers have developed new techniques for restoring and extending the life of "Caterpillar" products. Today, in their own shops, "Caterpillar" dealers can *rebuild* a great many worn or damaged parts which formerly required completely new replacement. In short, every dealer is richly acquainted with scores of modern ways and means for keeping your machines in good working condition. You can help by doing this:

Take your maintenance problems to your "Caterpillar" dealer* BEFORE *parts are worn beyond repair

Remember that excessively worn parts can cause damage to mating parts; that track parts, pistons and liners, crankshafts, cylinder heads, radiators and other items usually can be salvaged. Your problems are your dealer's problems. Go see him today. He'll do everything in his power to keep your machines operating. Your combined efforts will be reflected in longer equipment life.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL ENGINES
TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

NOW! when maintenance costs more than ever...

Penta* Protected WOOD PAYS OFF!

Keep your stock rolling with a minimum of maintenance . . . use PENTA! When you protect car lumber—and *all* lumber with PENTA . . . you cut maintenance costs by giving wood longer, more dependable life.

For years to come, PENTA will protect wood against termites and decay . . . will give wood greater serviceability and longer life. And your maintenance crews will find PENTA-PROTECTED wood is clean and easy to handle.

PENTA-PROTECTED wood costs you *less per year.* This saving is proved by railroad service records which show treated wood lasts three to four times longer than untreated wood.

Protect your investment in wood . . . use PENTA-PROTECTED wood not only for car lumber but also for poles, loading platforms, all wood buildings and other wood construction. For more information about this sound investment, write Dow, Dept. E-46, for free booklet, "Pointers on Penta."

INVESTIGATE Penta THE CLEAN WOOD PRESERVATIVE

will not leach . . . can be painted over

*PENTA is a popular abbreviation of the name of the chemical, PENTAchlorophenol.

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

DOW
Penta
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Why rubber gloves fit

● A glove of rubber fits many different hands perfectly because it is adaptable.

The True Temper Rail Anchor likewise fits perfectly, rail bases that are new or those considerably worn and corroded.

This True Temper feature provides economy, safety and ease in application to a most unusual degree. It is one reason why True Temper Rail Anchors are first choice on thousands of miles of track.

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THE NORDBERG *POWER JACK*

The NORDBERG *POWER JACK* will handle any kind of track, and work in any kind of ballast.

"Mechanical Muscles"

for all Raising-Reballasting Jobs

SPEED, accuracy, and ease of handling on or off the track are basic advantages of the Nordberg Power Jack for reballasting, general surfacing and all other operations where raising of track is involved. Lifting is accomplished by means of hydraulic rams actuated by oil under pressure. Alignment is maintained even when making heavy and high lifts. One Nordberg Power Jack easily keeps ahead of any tamping gang.

It will pay you to take advantage of the "mechanical muscles" of the Nordberg Power Jack to reduce maintenance costs.

For details, send for BULLETIN 138.

The NORDBERG *POWER JACK* will pay for itself in raising only 13.8 MILES OF TRACK

R450-R

Look to **NORDBERG**

. . . for continually improved TRACK MAINTENANCE MACHINERY *to do a Better, Faster Maintenance Job at Lower Cost*

NORDBERG MFG. CO., Milwaukee 7, Wisconsin

YOU'VE ASKED FOR IT

. . . and here it is!

HI-SPEED *ONE-PACKAGE* DIESEL FUELING

● When you crack the nozzle on this HI-SPEED Bowser Serv-A-Train there's a whirlwind of action that fills the fuel tank in a jiffy . . . in fact at 100 g.p.m.!

● EASY TO INSTALL

You just hook up the suction and electric power and you're ready to go! You can buy and install Bowser Serv-A-Trains for a fraction of the cost of erecting permanent pump house and equipment, fueling stations, etc.

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If you need to abandon a fueling station and transfer to another location all you do is disconnect the Serv-A-Train and MOVE! There are no expensive buildings, pipe and fittings to salvage.

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Send me full facts on this new Bowser Serv-A-Train.

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RAILROAD.....

ADDRESS.....

CITY..... STATE.....

BOWSER ESTABLISHED 1885

LIQUID CONTROL SPECIALISTS SINCE 1885

Higher Speeds Require Higher Safety Standards ...so use Pittsburgh SNOLITE White Paints!

Whiter, initially – stays whiter longer – on signs, crossing gates, fences and cattle guards

MODERN high speed rail transportation places a heavy burden on those responsible for greater railroad safety. Pittsburgh is happy to contribute to the solution of this problem with SNOLITE White Paint.

- **Pittsburgh SNOLITE** is a specially prepared fume-proof coating for crossing gates, signs, fences and other places where high visibility is important.
- **Accurate** shop and field tests by many railway systems over long periods of time have proved that it covers more thoroughly and wears better.
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- **Write Today** for Pittsburgh's free folder which explains fully the unusual properties of SNOLITE and suggestions for its use.

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Industrial Paint Division, Pittsburgh, Pa.
Factories: Milwaukee, Wis.; Newark, N. J.; Springdale, Pa.; Houston, Texas; Los Angeles, Calif.; Portland, Ore. Ditzler Color Div., Detroit, Mich. The Thresher Paint & Varnish Co., Dayton, Ohio. Forbes Finishes Division, Cleveland, Ohio. M. B. Suydam Division, Pittsburgh, Pa.

Pittsburgh Railway Finishes For Every Need

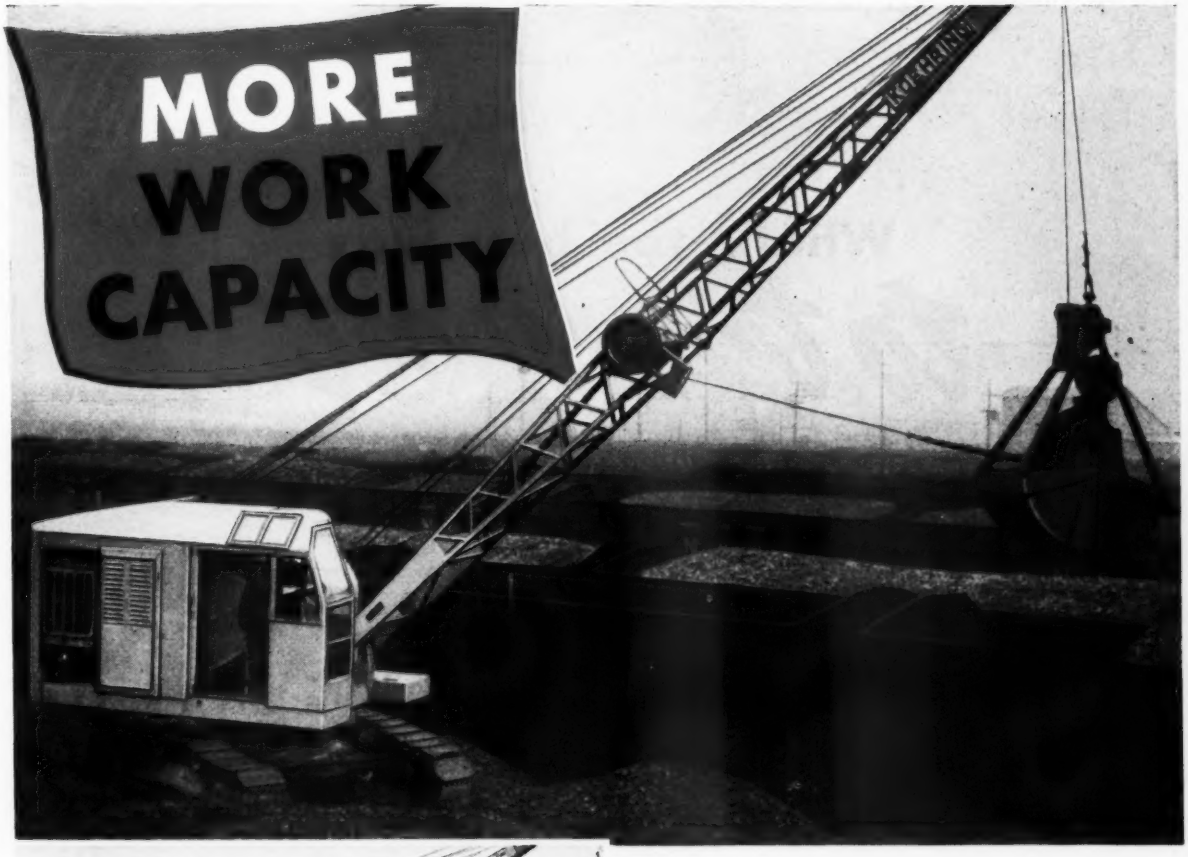
CARHIDE—for wood and metal freight cars of all types.
LAVAX SYNTHETIC ENAMELS—for locomotive and passenger cars.
STATIONHIDE—adds beauty and comfort to stations.
IRONHIDE—for iron and steel fixed properties.
SNOLITE—white fume-proof paint for signs, crossing gates, fences and cattle guards.

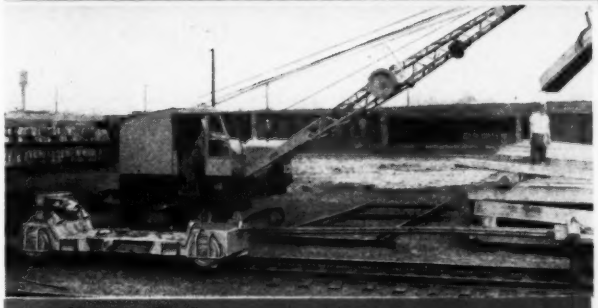
PITTSBURGH PAINTS

PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS

PITTSBURGH PLATE GLASS COMPANY

MORE WORK CAPACITY





Self-propelled RAILAID works both on and off-track, travels at 4 rail speeds up to 14.4 m.p.h. Crane loads and unloads itself on ramp-equipped propulsion car in less than 10 min., lifts 6.6 tons from carrier, 8¼ tons from ground, converts to clamshell, dragline, pile driver, shovel, hoe.

Railroad MUD-JACK® stabilizes track beds without interrupting traffic. Injection points are driven into water or ballast pockets in sub-grade, hydraulic pump forces slurry into weakened area, stabilizing existing material. Leaves firm sub-grade. Saves labor, reduces "slow orders".

with KOEHRING HEAVY-DUTY

Working on or off flat car . . . around yards or along the line, the reserve strength and operating stability of Koehring heavy-duty 304 give a definite advantage in extra work capacity. With 13.9-ton lift on crawlers (25 tons on rubber) the 304 handles extra heavy loads, clamshell and dragline buckets on a wide work range . . . has ample power, stamina and weight-stability for toughest digging with ¾-yard dipper. Heavy-duty strength beyond its rated capacities protects all rush schedules and routine assignments against costly down-time.

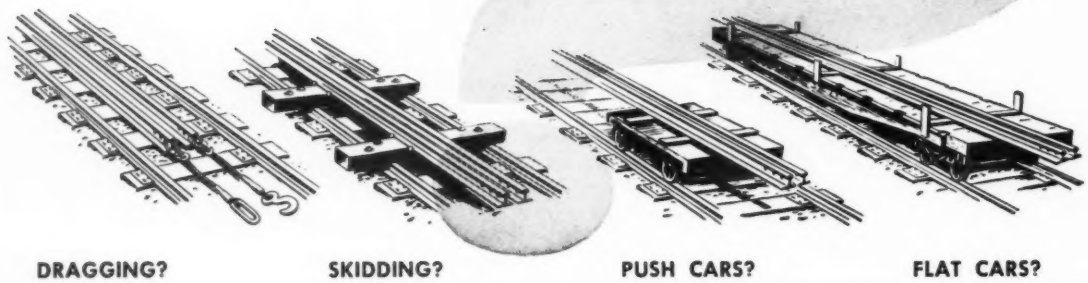
With every 304 crane or excavator attachment, big Koehring booster clutch cuts normal lever pull over 50% . . . reduces operator fatigue, yet retains "feel" of load. Heat-compensator spring makes clutch tension changes automatically . . . keeps operator and machine producing at top efficiency at all times.

For specific figures on 304 work capacity and complete information on its many heavy-duty mechanical features, write us. Other Koehring sizes lift up to 79½ tons . . . have dipper capacities to 2½ yards.

KOEHRING HEAVY DUTY

KOEHRING COMPANY, Milwaukee 16, Wis.

What's the best way *to transport* "RIBBONRAIL"



DRAGGING?
. . . fastening a chain or wire cable to the end of a long length and dragging it to the laying site.

SKIDDING?
. . . using skid ties to serve as runners on the rail in track. Welded rails are placed on skid ties and held by rail anchors.

PUSH CARS?
. . . hauling the long rails on push cars.

FLAT CARS?
. . . hauling the long rails on flat cars.

All of these methods have been successfully used for transporting welded rail. And any one of them may be the best method for you to use depending on the equipment available, the length of the rail, the size of the welding program, and the distance the rail has to be moved. We'll help you plan a transportation method as well as the six-station pressure-welding setup for producing RIBBONRAIL.

In planning a continuous rail program for your road, call OXWELD. Send for free booklet on transporting RIBBONRAIL.

Oxweld Railroad Service Company Room 1320
A Division of Union Carbide and Carbon Corporation
230 North Michigan Avenue
Chicago 1, Illinois

Gentlemen:

Please send me your booklet on transporting RIBBONRAIL.

Name_____

Position_____

Company_____

Address_____

OXWELD RAILROAD SERVICE COMPANY
A Division of Union Carbide and Carbon Corporation
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Carbide and Carbon Building Chicago and New York
In Canada:
Canadian Railroad Service Company, Limited, Toronto

OXWELD RAILROAD SERVICE

SINCE 1912 THE COMPLETE OXY-ACETYLENE SERVICE FOR AMERICAN RAILROADS

The term "Ribbonrail" is a trade-mark of Union Carbide and Carbon Corporation.

Under Every Condition

HIGH, LOW or NO LIFT,
LARGE, MEDIUM or FINE BALLAST
or NO NEW BALLAST AT ALL

The Smoothest Roadbed Ever Traveled

IS ACHIEVED AT AMAZING **SAVINGS with**

JACKSON

MULTIPLE TIE TAMPERS

VERSATILE

BEYOND COMPARISON

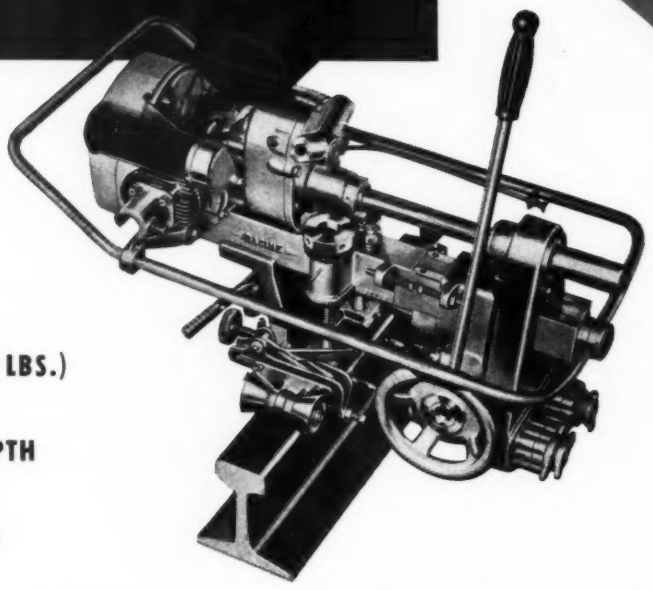
On major ballasting operations this machine has proved beyond the shadow of a doubt, its unrivaled ability to put up the finest, most uniform track in the shortest time and at the lowest cost per mile. But that's only one of its functions. Switch to the other set of tamping blades and it will **smooth** track, in those operations in which there is little or no lift and no new ballast is spread, better and far faster than any other method you have ever employed. The Jackson Multiple Tamper is a double-barrelled time and money saver no maintenance chief can afford to ignore. Let us tell you more about it.

*Savings made in a single season usually exceed the cost of the machine.

ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON, MICHIGAN

YOUR **EXTRA EMPLOYEE** THAT WORKS WITHOUT PAY

RACINE
Portable
BOND DRILL



- LIGHT IN WEIGHT (90 LBS.)
- TWIN SPINDLES
- CONTROLLED HOLE DEPTH
- FAST AND ACCURATE
- LEVER AND RACK FEED

A RACINE gas engine powered Portable Bond Drill does the work of several men. It frees man power for other jobs. An "extra employee" in every way but pay.

The RACINE Bond Drill is actually a rugged, accurate drill press built on horizontal lines. Readily rolled along or lifted by one man. Quickly clamped in position for drilling straight round holes. Easily removed to clear the track for traffic.

An adjustable gauge sets depth of drilling. Lever and rack feed enable the operator to maintain steady hole production, effortlessly. Simple, fast and accurate, this machine helps you to meet today's demand for more work — with less men — at lower cost. Write for complete 3-color catalog.

OTHER PORTABLE MACHINES BY RACINE

RACINE TOOL AND MACHINE COMPANY
1738 State Street • Racine, Wis.

STANDARD FOR QUALITY AND PRECISION • RACINE TOOL and MACHINE CO. • RACINE

"Crew Cut" FOR THE RIGHT OF WAY

MOWIN' ON DOWN with an International Super A tractor. Mower can be quickly and easily raised or lowered to cut 90° above horizontal or 45° below ground level.

International tractors handle trimming jobs quicker, better, wherever railroads run

Out along the main line, fast-working International tractors mow weeds, shovel snow, maintain roadbeds, improve drainage and handle a hundred off-track jobs quickly, easily and at low cost.

Our line of handy wheel tractors and rugged crawlers offers you the right machine for any job you have "workin' on the railroad." Every model combines brute power with easy handling and champion dependability. Every model is built to do more work with more speed, to make the most of every maintenance dollar.

Get the details from your International Industrial Distributor. He's part of a nation-wide service organization that's always at your call, wherever your equipment may go, through the hard-working years ahead.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

INTERNATIONAL

POWER THAT PAYS

protect steel structures . . . NO-OX-ID will

stop rust before it starts

Severe corrosive damage constantly threatens the vital, hard-to-replace links of our transportation network. Today, more than ever, bridges, viaducts, other steel structures must be protected against the corrosion caused by moisture, brine, locomotive gases, live coals and cinders, temperature extremes.

You can do this job with NO-OX-ID rust preventives. With NO-OX-ID "A Special" a single coat will stop rust before, or after, it starts, and the application is simple. Just wire-brush the surface to remove loose paint and rust scale. Then, for lasting protection, apply a single coat of NO-OX-ID "A Special." Metal loss is prevented, costly repairs eliminated, vital materials conserved and the safety factor of the structure preserved.

The proper application of the correct NO-OX-ID is preventive maintenance at its best. A Dearborn Engineer will gladly discuss your corrosion problems.

Please Note Our New Address

DEARBORN CHEMICAL COMPANY

Merchandise Mart Plaza • Chicago 54, Illinois

WRITE FOR THIS VALUABLE BOOKLET!

A copy of the Dearborn booklet entitled "NO-OX-ID for Maintenance of Steel Structures in the Railroad Industry" will be sent on request.

Dearborn Chemical Company
Merchandise Mart Plaza, Dept. RE
Chicago 54, Illinois

Have a Dearborn engineer call.

Name.....

Railroad.....

Address.....

City.....Zone....State.....

Dearborn
Reg. U. S. Pat. Off.

NO – OX – ID
IRON + = RUST

THE ORIGINAL RUST PREVENTIVE

For additional information, use postcard, pages 595-596

Who can show you how to handle ties for 30% less?

THIS man can. He's Bill Blake. He puts his shoulder to the job of helping railroads cut the cost of packaging, handling and distributing railroad ties. Bill represents Brainard's new system of tie distribution—the result of hard hours, weeks and months of research, tests, experiments. But the system is working—so very successfully that costs can be lowered as much as 30 per cent. The Brainard system uses two slack bands of special-made, heavy duty strapping applied at the tie-treating plant. This permits loading and unloading in large units or individually. Bill Blake has actual user's experience he will be glad to go over with you. You'll see how the Brainard system works for others; how it can whittle down the cost and time spent handling and distributing your ties. Bill Blake and our staff engineers are at your service.

COMPLETE STRAPPING SYSTEM, ENGINEERING, STEEL STRAPPING, TOOLS AND ACCESSORIES

Brainard
SHARONSTEEL
STEEL COMPANY

STEEL STRAPPING DIVISION, WARREN, OHIO

NEW GRINDER SAFETY with GREATER POWER

INGERSOLL-RAND *introduces* ANOTHER BIG FIRST... *the* NEW OVERSPEED SAFETY COUPLING...

The Overspeed Safety Coupling supplements, and is completely independent of, the regular factory-set weight type governor used in Ingersoll-Rand Air Tools.

This built-in unit, which operates in case of failure of the regular governor, eliminates the possibility of dangerous overspeed operation. If, for any reason, the motor speed exceeds the safe wheel speed, the NEW Overspeed Safety Coupling automatically uncouples the arbor and the wheel from the motor, making it impossible to operate the Grinder until the cause of overspeeding has been corrected.

GRINDER OPERATORS *Also Asked for* THESE *Extra* FEATURES

LONG LIFE ARBOR CONSTRUCTION—Widely spaced, permanently lubricated, precision ball bearings are located at each end of the arbor in a one-piece housing to provide new rigidity and longer Grinder life.

20% MORE POWER—A new, larger, four-vane, swastika-type motor gives 20% more power. Extensive use of light weight alloy castings results in more horsepower per pound. Grinding efficiency goes up and grinding costs come down.

QUIETER EXHAUST—It takes 10 of these new Grinders to produce exhaust noise equal to 1 of the previous machines. The low exhaust noise which is present, is pitched so as not to be irritating.

EXTRA EXHAUST POSITIONS—The operator can choose any one of four exhaust positions, spaced 90 degrees apart.

RUBBER-FACED VALVE—The new composition rubber-faced throttle valve closes properly even if small particles of foreign matter adhere to the valve seat. Replacement is inexpensive, and no lapping is necessary.

OPTIONAL HANDLE—In addition to the popular grip handle, a straight handle with a new safety-throttle lock is available.

Call us today and arrange for a demonstration of this powerful new Series 4 Air Grinder.

Ingersoll-Rand

630-B

11 BROADWAY, NEW YORK 4, N. Y.

ADDITIONAL INFORMATION

On Any of the Products Mentioned in This Issue

Below is a complete index of the products referred to in both the editorial and advertising pages of this issue. If you desire additional information on any of them, use one of the accompanying addressed and stamped postcards in requesting it. In each case give name of product and page number. The information will come to you directly from the manufacturer involved, without any obligation on your part.

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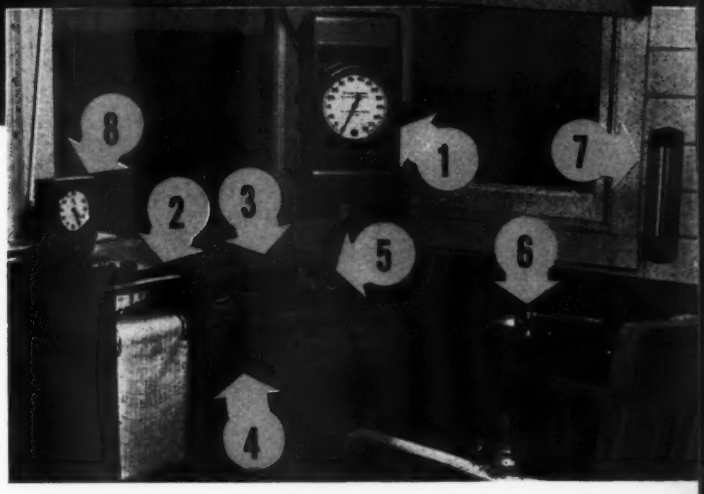
POSITIVE DOSAGE CONTROL and WEED KILLING ACTION

THE *Nalco* SYSTEM of WEED CONTROL

SPRAYING Nalco's H-170 "top-and-root" weed control with one of Nalco's new *labor-saving* Weed Control Cars provides positive dosage regulation, as well as complete records for future reference! H-170 is sprayed directly from tank car without mixing or dilution. It assures a complete top kill of all succulent vegetation, and extensive root kill to retard re-growth. Rainfall after application will not reduce H-170 effectiveness . . . Safe to use where livestock may be grazing . . . Will not disrupt track signal systems, or contaminate water supplies.

Write for detailed information on H-170 and the complete Nalco System of Weed Control.

NATIONAL ALUMINATE CORPORATION
6196 W. 66th Place • Chicago 38, Illinois
Canadian inquiries should be addressed to Alchem Limited, Burlington, Ontario

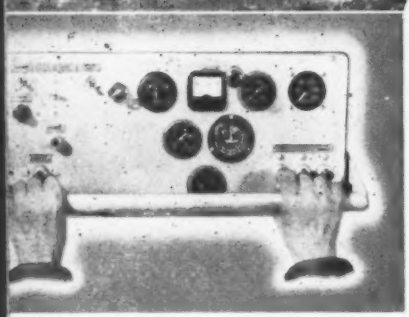


Top illustration shows Nalco Weed Control Car, with three-bank, 22-feet-wide sprays, and an additional 13-foot side spray boom for sidings. Lower photo shows operating controls of Spray Car. 1 Recording speedometer, 2 Recording H-170 flow meter, 3 Nozzle bank control valves for pinpoint spraying accuracy, 4 Left-side spray boom control, 5 Spray manifold pressure gauge, 6 Nalco Meter-Chem main control valve 7 Indoor-outdoor thermometers, 8 Timing clock. Not shown are intercommunicating telephone equipment for direct contact between Nalco Spray Car and work train locomotive, and direct-connected 50-foot auxiliary hose reel and spray nozzles for off-track spraying.

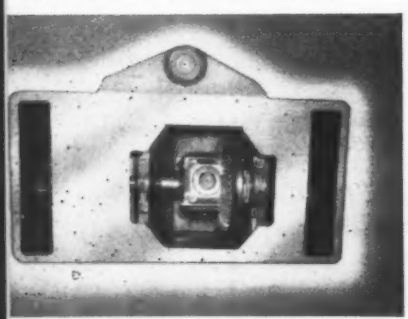
THE *Nalco* SYSTEM • Serving Railroads through Practical Applied Science

Rubber-tired D Roadster TOURNAPULL

goes anywhere to speed rail maintenance



Dashboard switches control steering and scraper operations . . . put power at point of action . . . give faster, more accurate control. Gear shift lever, foot brake and accelerator complete simple control system. Operators can be trained in a few hours.



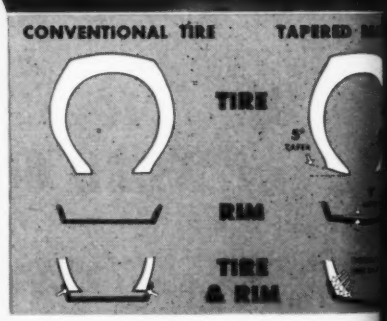
Revolutionary Tournamatic differential and powerful final drive keep "D" rolling through mudholes or over slippery grades where other units stall. Result: less weather downtime, longer work season, more roadbed serviced, lower cost maintenance.

3 TO 4 TIMES FASTER THAN CRAWLER RIGS!

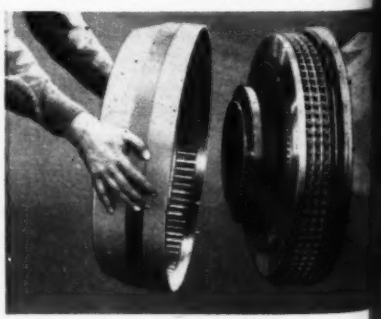
Careful selection of off-track tools pay off in holding down costs on right-of-way maintenance. D Roadster Tournapull, LeTourneau's 28 m.p.h., 9-ton capacity "maintenance handyman" gives you a one-man machine that goes anywhere *fast* to maintenance assignments. It handles scraper dirt 3 to 4 times faster than average crawler rigs, self-loads, or can be pusher-loaded for big production on fleet operation. Even more important is its go-anywhere ability . . . via highway, down the track, along the right-of-way. Big tires easily cross rails or curbs without blocking, can drive safely over trestles, across yards, over blacktop, through mud, sand, soft fill where other units bog down.

Here is the best RR maintenance dirtmover ever offered. Gets more jobs done, faster, easier, with less manpower. Eliminates delays in maintenance service, eliminates delays to rail traffic, eliminates headaches of supervision, dispatching and management. Check money-saving applications illustrated, then write for detailed, job-proved performance data on type of work you have in mind.

R. G. LeTOURNEAU, INC.
PEORIA, ILLINOIS



Big 63½" high x 20" wide tires, with normal operating pressures as low as 40 lbs., provide extra flotation in extremely soft going. The 5° taper doubles tire-to-rim grip . . . prevents tire slipping . . . assures long, economical tire life . . . makes retreading practical.



4-wheel air brakes with 719 sq. in. of braking surface per wheel, or total of 2876 sq. in., assure quick, safe, sure stops . . . require minimum maintenance . . . improve maneuverability . . . give operator confidence for faster operation on all footings.

Handles to 7 cu. yds. gravel, ballast, cinders — One-man "D" loads, hauls, and spreads in one operation over long or short distances. Digs from pit or stockpile . . . no big, expensive loading unit or special spreading tools needed. Works any length haul independent of work-train service.

Stockpiles coal, dozes, push-loads other units — With dozer blade on front, "D" eliminates need for odd-job bulldozer . . . stockpiles coal . . . push-loads other "D's" on fleet operation . . . handles emergency dozing . . . backfills trenches . . . pushes dirt around culverts . . . gives help to short-handed section crews.

Crosses tracks, curbs, pavement on job-to-job moves — speeds to job at 28 m.p.h. clip . . . goes right to work, with no loading delays. Big, soft-cushion 18.00 x 25 tires deflect load evenly over obstructions.

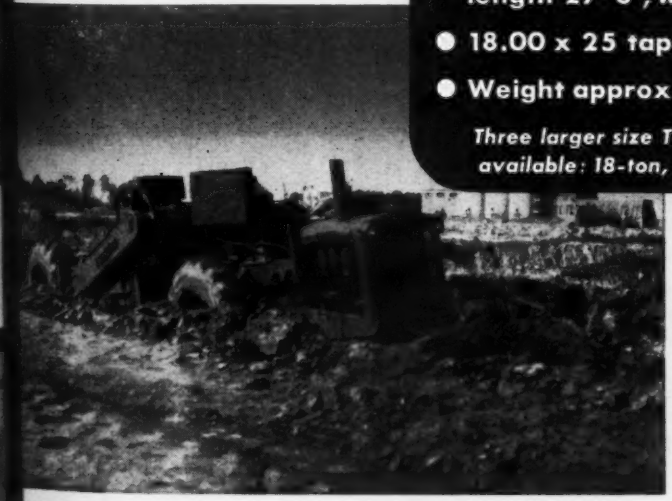
SPECIFICATIONS

D Roadster with E-9 Carryall Scraper

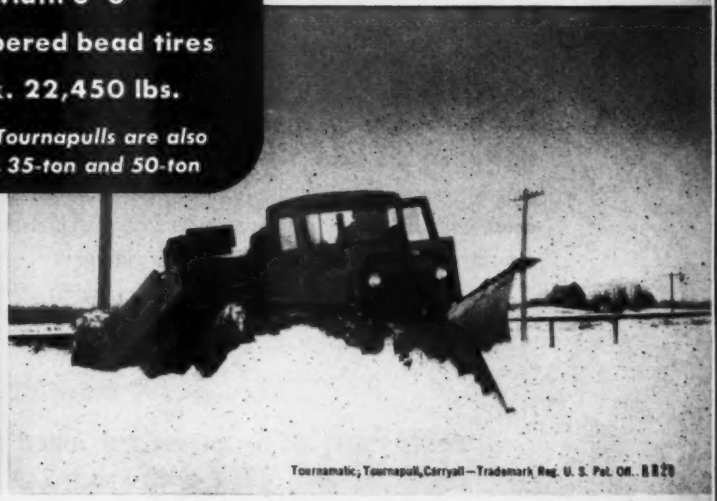
- Capacity 9 tons - 7 cu. yds.
- 5 speeds forward to 28 m.p.h., 122 h.p. diesel
- Fingertip electric control
- Positive, power steer
- Heavy-duty transmission, sliding gear type
- 90° turn—min. turning radius 13′
- 4-wheel air brakes, 2876 sq. in. total braking surface
- Overall dimensions — length 27′ 3″; width 8′ 3″
- 18.00 x 25 tapered bead tires
- Weight approx. 22,450 lbs.

Three larger size Tournapulls are also available: 18-ton, 35-ton and 50-ton

Digs, cleans ditches . . . widens embankments—new high-speed method of maintaining ditches, practically eliminates extra finishing. On this job, "D" self-loaded 5 pay yds. top soil, clay, silt in 1 min.



Builds, relocates grades for sidings, spurs, main lines — "D" works on roads or drainage jobs singly, or in fleets, with or without pusher. In slippery going, Tournamatic differential automatically delivers up to 4 times the tractive effort of slipping wheel to wheel on firmer footing.



Tournamatic, Tournapull, Carryall—Trademark Reg. U. S. Pat. Off.

Plows snow in yards, access roads — Easily mounted V-Type Snow Plow changes "D" into efficient snow plow... correctly curved blade, plus plenty of power, smashes deep drifts . . . opens yards, sidings, loading tracks, access roads. Scraper can load and haul snow and ice from yards.

Send Now to: **R. G. LeTOURNEAU, INC., Peoria, Illinois** Tell us more about 9-ton, 122 h.p. D Tournapull . . . .

also data on:

NAME..... TITLE.....

COMPANY.....

STREET..... CITY..... STATE.....

☐ 18-ton

☐ 35-ton

☐ 50-ton

LETOURNEAU LET EQUIPMENT

What's the best way...

to cut rail cropping costs

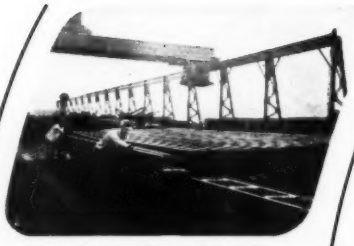
by portable field units?
...or fixed installation?

Both are excellent!... but, many roads find that a centrally located rail cropping plant usually lends itself to a more efficient and economical operation.

With a fixed installation, the work can be set up on a continuous production basis... rails can be collected at a central point, and the road can realize the full capabilities of specialized workmen.

As shown in the accompanying photographs, rail cropping is simple, easy and quick. The Airco developed rail cropping machine employs two highly efficient, oxyacetylene flame cutting tips, which cut rails of any size, making as many as 25 cuts an hour, and producing a surface that requires a minimum of grinding.

For further information, write your nearest Airco office.

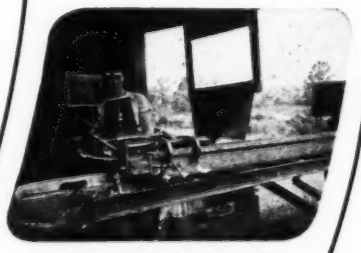


...conveying the rail to the cropping machine.

...making the bottom, or backward, cut. (Note: This machine is portable and can be transported to the right-of-way, if so desired.)

...cropped rail, showing cut quality.

...finishing the cut end.



...drilling bolt holes in rail end.

COSTS COME DOWN UNDER THE AIRCO PLAN

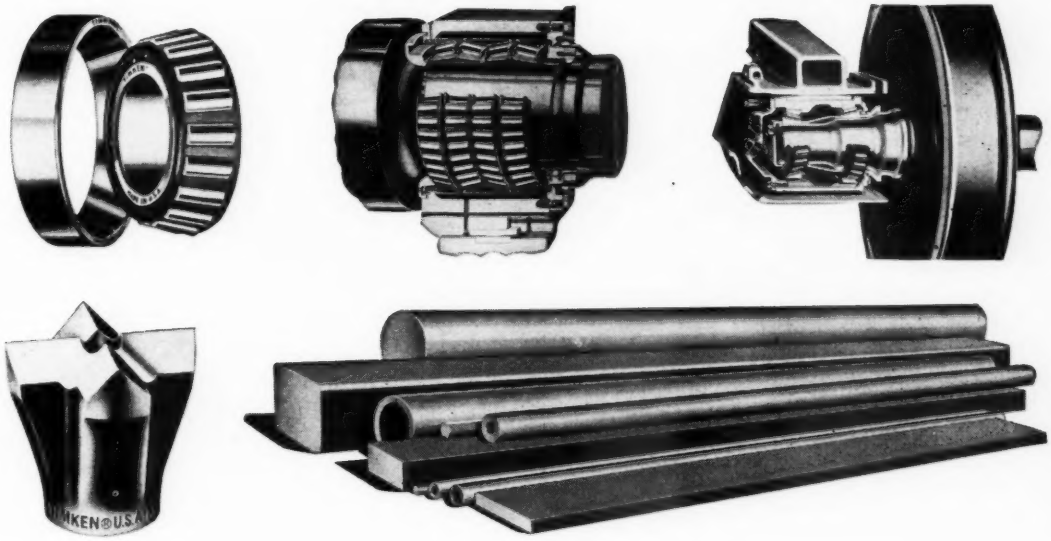
AIRCO

AIR REDUCTION

AIR REDUCTION SALES COMPANY • AIR REDUCTION MAGNOLIA COMPANY
AIR REDUCTION PACIFIC COMPANY
REPRESENTED INTERNATIONALLY BY AIRCO COMPANY INTERNATIONAL
Divisions of Air Reduction Company, Incorporated
Offices in Principal Cities

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.



Little words that mean a lot

There's no room for compromise, doubt or question in those brief words above. They mean: "Timken" is the registered trade-mark of The Timken Roller Bearing Company. And that meaning is mighty important to you.

The trade-mark "Timken" assures you of getting the highest quality tapered roller bearings, fine alloy steel bars, steel tubing or rock bits—all products of The Timken Roller Bearing Company.

That's why it pays to remember that "Timken" *is* a trade-mark, not a type of product. That it isn't really a product of the Timken Company unless it's backed up with this trade-mark.

Why not make it a habit to look for the trade-mark "Timken" when you buy tapered roller bearings, alloy steel bars, tubing or rock bits. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN

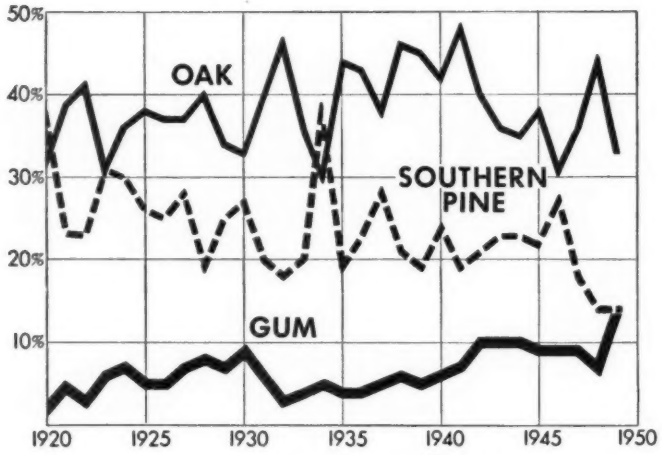
TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▱ BEARING TAKES RADIAL ◫ AND THRUST ⊣◫⊢ LOADS OR ANY COMBINATION ✳

Gum Crossties Are as Good as Oak or Better . . .

when treated by modern process that prevents decay and assures top quality and longer life in track



THIS GRAPH SHOWS HOW the depletion of Southern pine and the sharp increase in the cost of oak have boosted the use of gum ties from two per cent of the total of all varieties treated in 1920 to 14 per cent in 1949. Even though price and procurement difficulties are forcing greater utilization of gum, you avoid the hazard of decay and get top-quality crossties with Vapor-Drying.

When railway engineers or timber experts discuss gum for crossties, they usually agree that ***when properly seasoned and treated:***

1. Gum has excellent resistance to mechanical wear.
2. It checks and splits much less than oak.
3. It has long life in track.
4. No anti-splitting devices are needed.
5. It has adequate strength, and . . .
6. In many sections it is cheaper and more plentiful than oak.

These would seem to be ideal qualities for crossties. Why, then, is gum not used more extensively?

Because gum tends to decay rapidly during the air seasoning period, prior to preservative treatment. Although "rot on the yard" can be partially avoided by restricting the cutting of gum to wintertime and by very careful handling of the timber in air seasoning yards, a modern method now offers POSITIVE means of eliminating decay.

That modern method is Vapor-Drying*, a process which eliminates the many months of air seasoning. Gum ties are now being shipped directly from sawmills to treating plants where they are Vapor-Dried and creosoted in a few hours. With this new process, preservatives penetrate deeper and are better distributed. Even the heartwood of red gum, so vulnerable to decay because it is impervious to preservatives, is completely sterilized. Moreover, any checking which may have begun before Vapor-Drying, is arrested. The result is ties which competent railway and wood preserving authorities declare are as good or better than oak, and often much cheaper.

Gum is plentiful. Large stands exist all over the eastern United States, especially in the South, and also west of the Mississippi. It is not used as generally or for as many purposes as some other species, hence tie producers encounter less competition.

But regardless of species, Vapor-Drying offers many advantages in the production and treatment of ties—ties that will last longer and reduce maintenance costs. Several roads, including the Southern, Norfolk and Western, Clinchfield, and Charleston and Western Carolina are now using Vapor-Drying ties. Let us give you complete and factual information on how ***your*** road can profit from their use. Write Vapor-Drying Division, Taylor-Colquitt Co., Spartanburg, South Carolina.

This is the second of a series of discussions on the economic aspects of Vapor-Drying. Watch for the next in an early issue. Reprints of the first advertisement, showing how Vapor-Drying can save upwards of $100 a mile, are available upon request.

TAYLOR-COLQUITT CO. T·C TIMBER CONSERVATION ®

*Process patented

(Advertisement)

NEW Pittsburgh BRUSH KILLER 22

the *Standard for Quality*

WITH THE ADDED PROTECTION OF...

THFA* LOW VOLATILE

Tetrahydrofurfuryl alcohol

* U.S. PATENTS PENDING

Esters of 2, 4-D, and 2, 4, 5-T

PITTSBURGH'S NEW BRUSH KILLER 22, a formulation of THFA Esters of 2,4-D and 2,4,5-T has been proven, by authoritative tests, to be one of the LOWEST VOLATILE brush killers available.

For effective control, with added protection to valuable crops, use Pittsburgh Brush Killer 22 on:

Aspen	Cottonweed	Hornbeam	Prickly Ash
Apple, American Crab	Currant	Horsechestnut	Raspberry
Barberry Colorado	Elderberry	Juneberry	Rose, Cherokee
Birch	Elder, Box	Locust, Black	Sagebrush
Blackberry	Elm	Locust, Honey	Sassafras
Brambles	Gum, Black	Mesquite	Silverberry
Buckbrush	Gum, Sweet	Mulberry	Skunkbrush
Catalpa	Hackberry	Oaks	Shadbush
Cedar, Salt	Hawthorn	Osage Orange	Spicebush
Cherry, Choke	Hazel	Pine	Sumac
Cherry, Wild	Herculesclub	Poison Ivy	Sweetfern
Chestnut	Hickory	Poison Oak	Wild Grape
Chinaberry	Honeysuckle	Poplar	Willow

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ORGANIC INSECTICIDES: Benzene Hexachloride, Toxaphene, Dichloro Diphenyl Trichloroethane, Aldrin, Dieldrin, Chlordane.

ORGANIC PHOSPHATE INSECTICIDES: Parathion Wettable Powders, Parathion Liquid Concentrate, Metacide.

WEED KILLERS: 2,4-D Acid, 2,4-D Amine Concentrates, 2,4-D Ester Formulated Concentrates, 2,4-D Sodium Salt Monohydrate, 2,4,5-T Formulations.

FUNGICIDES, SEED DISINFECTANTS, COTTON SPRAYS AND DUSTS, AND OTHER SPECIAL AGRICULTURAL CHEMICALS.

WRITE FOR TECHNICAL BULLETIN TODAY!

PITTSBURGH AGRICULTURAL CHEMICAL COMPANY

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PITTSBURGH COKE & CHEMICAL CO.

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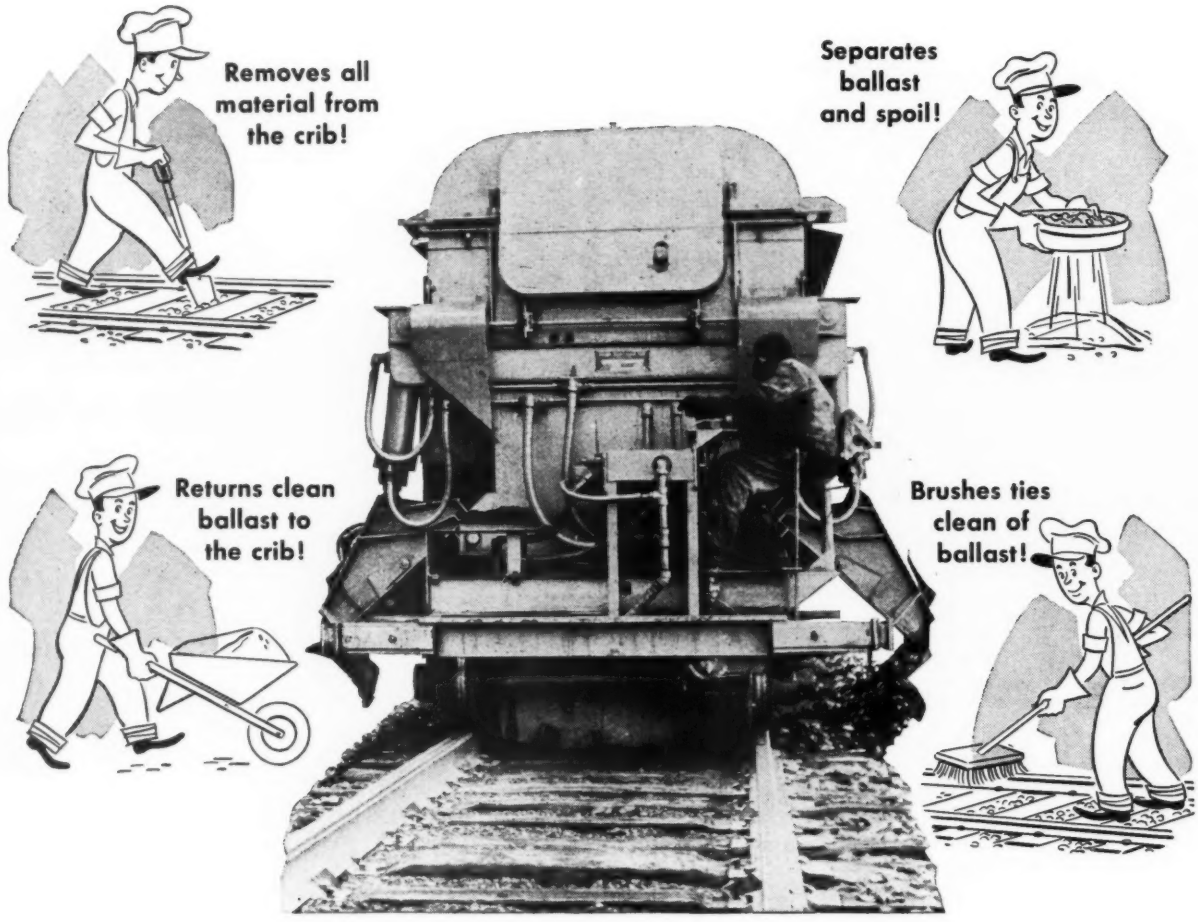

Removes all material from the crib!
Separates ballast and spoil!
Returns clean ballast to the crib!
Brushes ties clean of ballast!

Only the McWilliams Crib Cleaner Does the Complete Job in One Operation

Only the McWilliams Crib Cleaner will remove all materials from between the ties, separate ballast and dirt, return ballast to track, and deliver dirt to side of right-of-way in one operation.

Cribbing action is speeded up by plows which break the seals at the ends of ties . . . brushes are then provided to sweep the ballast from the top of the ties into the cribs, completing the job.

With screens removed, all material in the crib can be excavated and conveyed to a desired distance from the track.

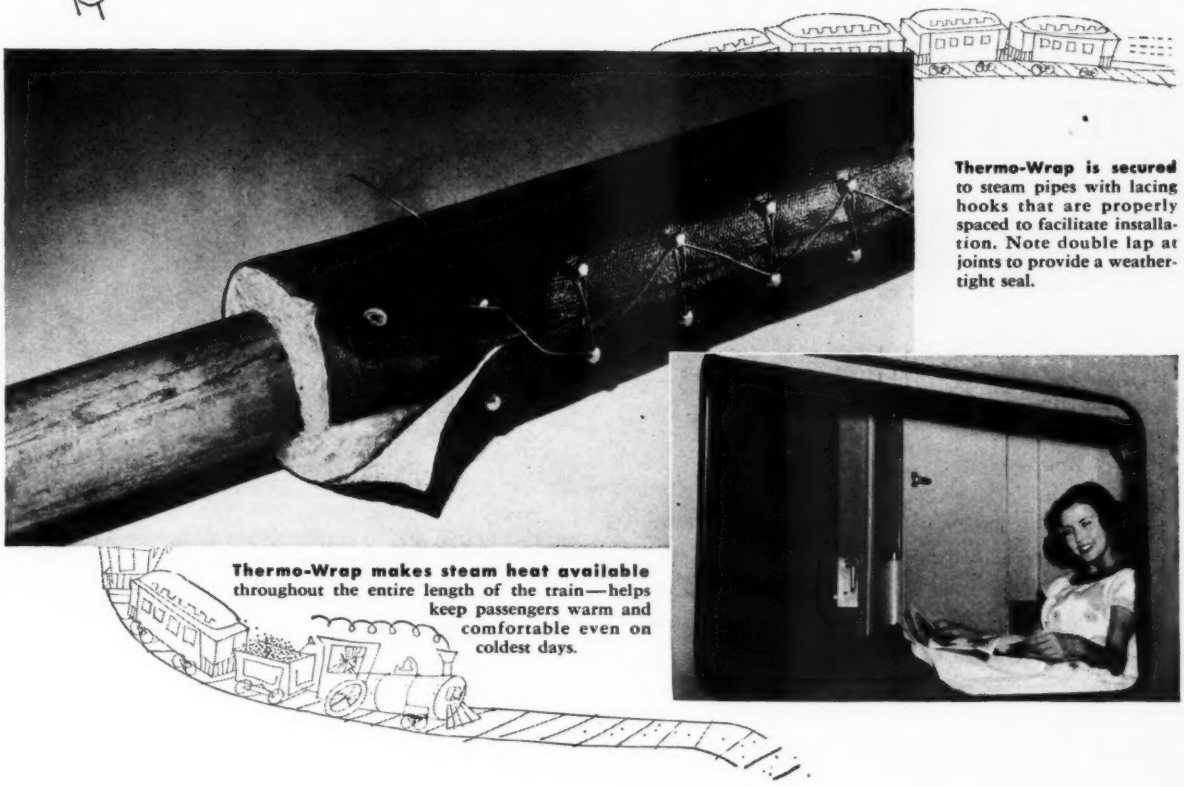
The machine is operated by one man, and cleans and excavates from one to three cribs per minute depending on the tie spacing. It is self-propelled at speeds up to 20 miles per hour.

Write today for complete information on the efficiency and economy of the McWilliams Crib Cleaner.

Railway Maintenance Corporation

Designers and Manufacturers of: Moles; Super Moles; McWilliams Crib Cleaners; Ⓡ Track Raiser and Air Tampers; McWilliams Multiple Tool Air Tamper; R.M.C. Rail Joint Packing.

New J-M Insulation saves heat... helps stop cold-car complaints



Thermo-Wrap is secured to steam pipes with lacing hooks that are properly spaced to facilitate installation. Note double lap at joints to provide a weather-tight seal.

Thermo-Wrap makes steam heat available throughout the entire length of the train—helps keep passengers warm and comfortable even on coldest days.

Cover your car heating lines with Thermo-Wrap, the improved Johns-Manville lace-type insulation, and you'll keep costly heat *inside* the pipes where you want it.

This not only saves fuel—it also helps keep passengers warm and comfortable throughout the length of the train!

Thermo-Wrap owes its exceptional efficiency to an insulating medium of twisted asbestos fibers held together by asbestos yarn, and enclosed in a woven asbestos jacket. Over its entire outside surface, this jacket is coated with a tough, durable, and fire-resistant waterproof coating to assure maximum protection against abrasion, mechanical abuse and moisture. Even in the most rugged railroad service, Thermo-Wrap stands up under the impact of rain, sleet, snow and flying ballast.

In addition to the fuel-saving serviceability factors, you will find Thermo-Wrap economical to use because it can be quickly and easily applied on straight or curved pipe . . . fits tight and stays tight on the job. For further information, write for Folder IN-132A. Address Johns-Manville, Box 290, New York 16, N. Y. In Canada: 199 Bay Street, Toronto 1, Ontario.

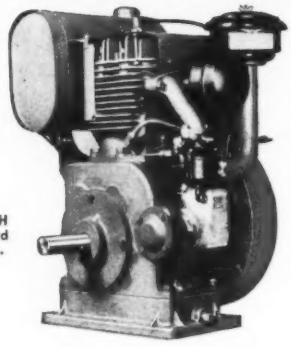
JOHNS-MANVILLE JM PRODUCTS

Johns-Manville

93 YEARS OF SERVICE TO TRANSPORTATION

Four Single-Cylinder WISCONSIN *Air-Cooled* ENGINES Offering MORE POWER ADVANTAGE

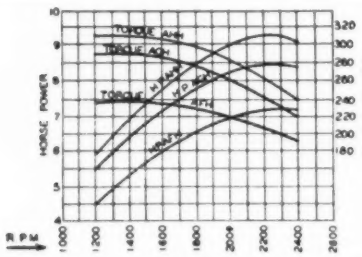
6 to 9 H.P.



AEH, AFH, AGH, and AHH single-cylinder standard engine models, 6 to 9 hp.

This series of single-cylinder models have all of the traditional Wisconsin heavy-duty features such as self-cleaning tapered roller bearings at both ends of the crankshaft, rotary-type, high tension OUTSIDE magneto operating as an independent unit, and maximum torque at all usable speeds.

MODELS	AEH	AFH	AGH	AHH
Bore.....inches	3	3¼	3½	3⅝
Stroke.....inches	3¼	4	4	4
No. of cylinders.....	1	1	1	1
Displ. cubic inches.....	23	33.2	38.5	41.3
H.P. and R.P.M. range.....	3.9 at 1600	6.0 at 1600	7.2 at 1600	7.7 at 1600
	6.1 at 3200	7.2 at 2200	8.4 at 2200	9.2 at 2200
Net weight in lbs., Standard Engine	130	180	180	180
Added weight for clutch.....	35	35	35	35
Added weight for reduction.....	25	60	60	60
Added weight for clutch reduction..	80	80	80	80



POWER CURVE AND HORSEPOWER LISTING SHOWS MAXIMUM DYNAMOMETER HORSEPOWER OF ENGINE complete with fan, muffler, and air cleaner. For continuous heavy-duty operation do not rate the engine at more than 80% of the horsepower shown at any given speed.

Third in a series about Wisconsin Engines. Entire series yours on request. For more detailed information, your inquiry is invited.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46 WISCONSIN

Safety FIRST *Built to* LAST *Efficient* ALWAYS

RYD-IN *Automatic* COUPLERS

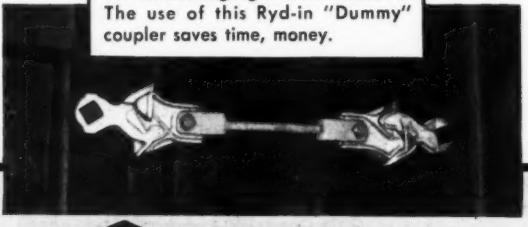
Wt.—steel, 6 lbs. Aluminum, 2 lbs.

SAFE Ryd-in Couplers engage instantly, positively — *automatically*. No manual guidance required. Should derailment occur, Ryd-in Couplers minimize the hazards by keeping motor cars and trailers in true alignment, close to the track.

SUPER-RUGGED Built to withstand the shock and strain of heavy loads, yet light in weight. No jackknifing.

EFFICIENT Ryd-in Couplers operate dependably, are always on the job—cannot be misplaced. Because all Ryd-in Coupler bodies are identical, any two of like size will engage. No "male and female" construction means there's no need to reverse equipment. Ryd-in Couplers are easy to attach. Complete with nuts and bolts, they fit any motor car and trailer equipped with the A.R.E.A. standard drawbar.

For Overhanging Trailer Loads... The use of this Ryd-in "Dummy" coupler saves time, money.



RYD-IN

Let Rydin make a test installation on your equipment. Write us for details.

RYDIN RAILWAY EQUIPMENT CO.
Railway Exchange Building, Chicago 4, Illinois

It's what's "around the hole" that counts.

This is why so many railroad men like Armco Liner Plates for undertrack construction. They cost less to carry a given load than any other type. Corrugated metal design provides safe strength and eliminates excess weight and material.

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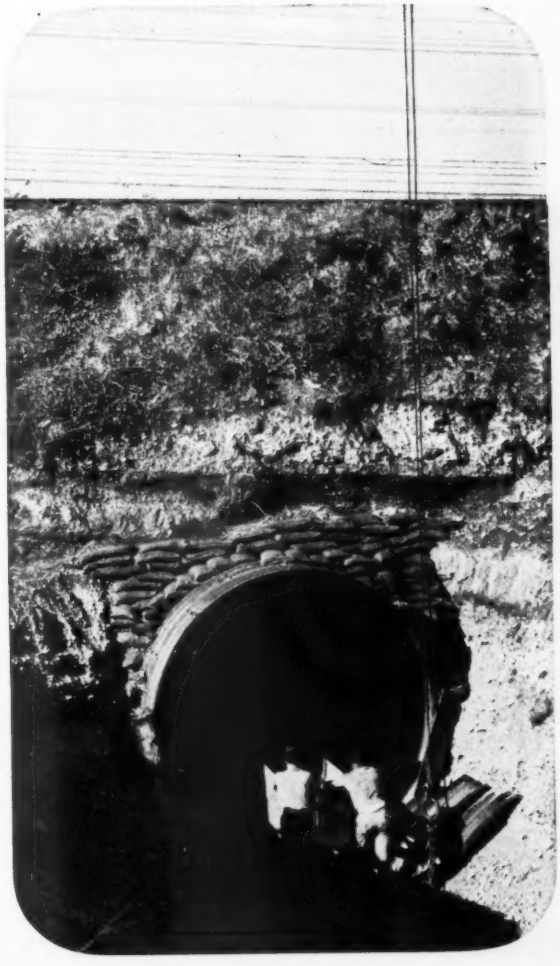
Other advantages of Armco Plates include fire-resistance and freedom from future maintenance expense. Use them with confidence for placing new openings or relining existing structures. Write for complete information. Armco Drainage & Metal Products, Inc., 3811 Curtis St., Middletown, Ohio. Subsidiary of Armco Steel Corporation. Export: The Armco International Corporation.



Armco Liner Plates ARMCO

MORE SCRAP MEANS MORE STEEL
TURN YOURS IN TODAY!

Increases
RAIL GRINDING ACCURACY

NEW P-45
PORTABLE RAIL SURFACE GRINDER

This new, one-man cup wheel machine grinds welded rail ends and removes mill tolerance and scale before heat treating. With a high degree of accuracy at a minimum of operator's skill and effort . . . gives a smooth, highly polished surface. Portability and light weight make it ideal for heavy traffic lines.

Check these advantages!

- √ 3½ H.P. air-cooled gasoline engine.
- √ Adjustable V-Belt Drive acts as overload release, preventing damage to other moving parts.
- √ Cup Wheel is adjustable to compensate for wear.
- √ Ball bearings and wearing parts are protected against dust and dirt.
- √ Rollers on carriage guide are adjustable—assure proper cutting angle of grinding wheel.
- √ Length, 58 inches — Width, 14½ inches — Height, 25½ inches — Weight, 225 lbs.

● *Write* for more infomation on the P-45 and other fast, easy-to-operate track equipment.

Railway Trackwork Co.

3207 KENSINGTON AVE., PHILADELPHIA 34, PA.

Distributors for

Burro Cranes
Dapco Sprayers
LeRoi Air Compressors
McCulloch Chain Saws
THOR Electric Tools
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4182

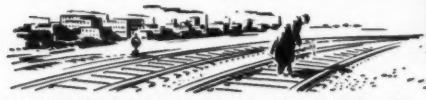
Cut Costs, Speed Work
on Construction and Maintenance Jobs!

with **ONAN** *Portable* **ELECTRIC PLANTS**

5 KW D.C. model with carrying frame.

Take an Onan portable electric plant to every right-of-way maintenance or construction job! It will supply quick "plug-in" electric power for cost-cutting, fast working electric tools—drills, saws, nut runners, grinders, pipe threaders or any motor-driven equipment. Lightweight models from 400 to 3,000 watts A.C.—750 to 5,000 watts, D.C. Available with carrying handles, frames or dolly-mounted. Larger water-cooled models for rail cars or work cars—gasoline driven: 5,000 to 35,000 watts. Diesel driven 12,500 to 55,000 watts

One man takes 'em anywhere on wheels!



Write for folder showing complete range of A.C. and D.C. models.

Onan PRODUCTS **D. W. ONAN & SONS INC.**

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HOW ABOUT a system of your own?

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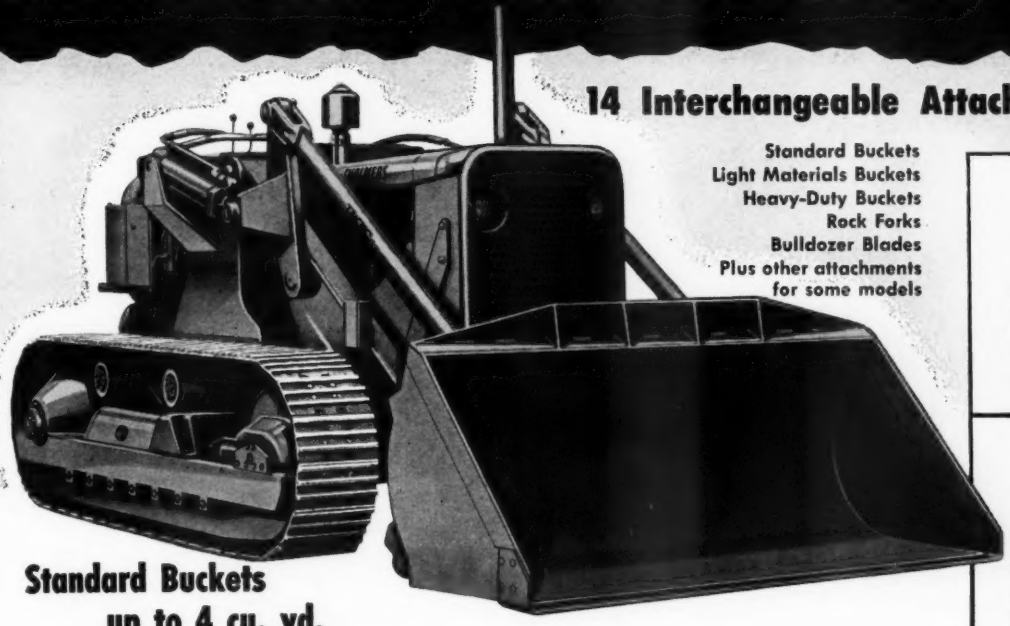
Layne WATER SUPPLY **WELLS & PUMPS**

NOW... Front-End Shovels for ALL 4 New ALLIS-CHALMERS Tractors



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Standard Buckets
Light Materials Buckets
Heavy-Duty Buckets
Rock Forks
Bulldozer Blades
Plus other attachments for some models

Standard Buckets up to 4 cu. yd.
(light materials buckets up to 7 cu. yd.)

1-Yd. HD-5G
Drawbar hp.: 40.26
Dumping Height*: 9 ft. ¼ in.
Total Weight: 16,200 lb.

2-Yd. HD-9G
Drawbar hp.: 70
Dumping Height*: 11 ft. 4½ in.
Total Weight: 29,800 lb.

3-Yd. HD-15G
Drawbar hp.: 102
Dumping Height*: 12 ft. 8 in.
Total Weight: 40,000 lb.

4-Yd. HD-20G
Hydraulic Torque Converter Drive—175 net engine hp.
Dumping Height*: 13 ft. 5 in.
Total Weight: 61,600 lb.

*Height of bucket hinge

Introducing a New Era of Tractor Usefulness . . .

These new Tractomotive shovels on the larger size Allis-Chalmers tractors now bring you the same wide utility, the same outstanding performing ability as the popular HD-5G—the Tracto-Shovel that revolutionized excavating and material handling.

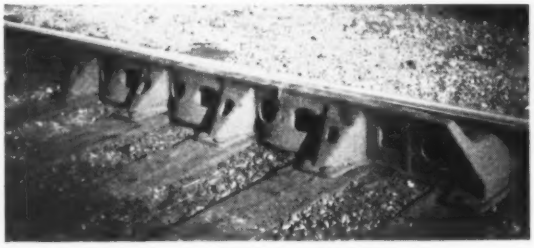
The Newest, Finest Tractor Line on Earth . . .

The new Allis-Chalmers tractors are not just refinements of existing models . . . *they are new from the ground up* . . . without compromise anywhere in design or materials. Back of their design are your own ideas and those of your operators and mechanics. These are combined with the vast experience of Allis-Chalmers to set new standards of Performance, Durability, Simplified Servicing, Ease of Operation.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.
Originator of the Torque Converter Tractor

Use Q and C Manganese Guard Rails

to Assure Safety and Economy



The design and rugged construction of The Q & C One-Piece Guard Rail assure strength, safety, durability and economy. They are easy to install and a minimum of maintenance is required, resulting in reduced costs.

Q & C Guard Rails are well braced to resist thrusts of the heaviest equipment and are made of full manganese steel for various rail sizes and provided with a self-cleaning feature to prevent the accumulation of cinders, snow and ice.

Specify Q & C Guard Rails on your requisitions.

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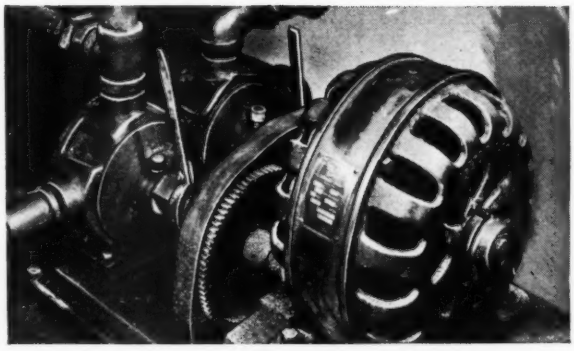
Chicago 5. New York 6. St. Louis 1.



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Cedar Falls, Iowa

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ESSENTIAL PRODUCTS

***Double-Life* FINISH—Sealed in Zinc**—Actual service tests reveal distinct economies are effected by specifying Sealtite Essential Products with Double-Life Hot-Dipped, sealed in zinc finish. Corrosion is retarded—the fasteners have much longer life and expensive replacements are eliminated. Protect your investment—*specify* Hot-Dipped Galvanized—Sealed in zinc.

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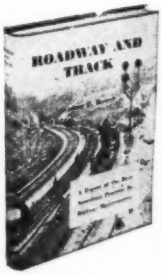
Serving 72% **OF AMERICA'S CLASS I RAILWAYS**

The Standard Book on Maintenance
ROADWAY AND TRACK
By Walter F. Rench
Formerly Supervisor on the Pennsylvania Railroad



For almost 30 years this book has been the standard text on maintenance. In the third edition all types of track machines are described and their utilization to best advantage clearly explained. Standard practice in operations only partly mechanized is also given.

By simply referring to the index you can find experience-tested methods for handling almost any track maintenance problem you are likely to meet. More than 100 illustrations show how the work is done and helpful tables facilitate quick figuring. Send for a copy of this helpful book today and give it a careful examination. If not entirely satisfactory you can return it within ten days of receipt for full cash refund.

350 pages, 132 illus., tables, 6x9, $5.00
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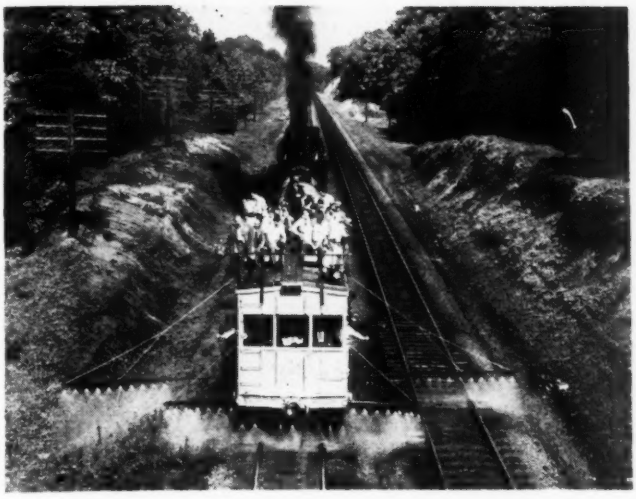
RELIABLE HERBICIDES—

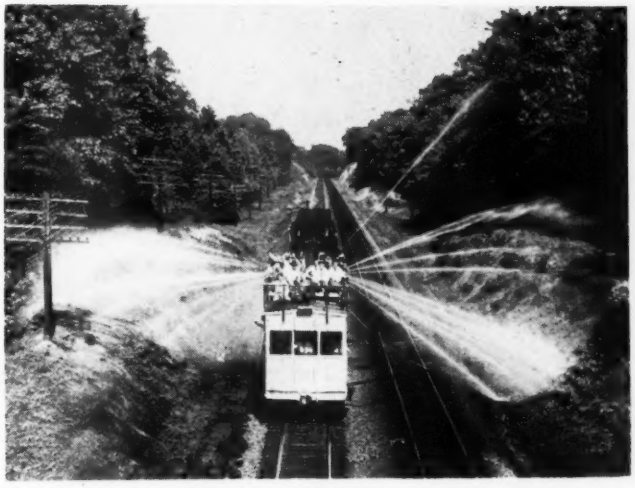
For Roadbed Treatment



Newly constructed spray cars provide many new features designed to efficiently apply chemical weed killers to roadbed with complete coverage.

Right-of-way Treatment

HIGH PRESSURE GUNS, CAPABLE OF COMPLETELY SATURATING TROUBLESOME BRUSH WITH BRUSH KILLING CHEMICALS, ARE MOUNTED ON NEW SPRAY CARS. FULL COVERAGE OF 100 FEET EITHER SIDE OF CENTER OF TRACK CAN BE ACHIEVED.



Complete Weed and Brush Killing Service

THE R. H. BOGLE COMPANY

ALEXANDRIA, VIRGINIA

ATLANTA, GA. **MEMPHIS, TENN.**

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FOR EVERY REQUIREMENT

Illustrated here are only a few of the many Schramm Construction Tools available . . . tools representing the finest material and workmanship, that have been tested and proved over a period of years.

The complete list includes: Limbing Saws, One and Two Man Chain Saws, Concrete Vibrators, Sandblasts, Air Guns, and all accessories . . . Hose and Hose Couplings, Drill Rods, Detachable Bits, Steels and Chisels.

Combinations are suitable for operation by the complete line of Schramm Compressors including: 20—35—60—105—210—315 and 600 cu. ft. sizes. There is a size and type for every requirement, no matter how large or small.

Complete stocks of tools are available for prompt shipment from Distributors and Factory Stock.

Write for Bulletin SCT-51.

SCHRAMM INC.

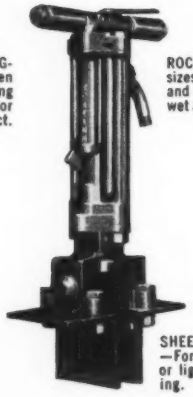
The Compressor People

WEST CHESTER • PENNSYLVANIA

TIE TAMPER—A well balanced tool to tamp ballast under railroad ties.

BACKFILL TAMPER—Tamps more yards of dirt than several men with hand tools.

TRENCH DIGGER—For open trench digging where operator can stand erect.



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CLAY DIGGER — For digging in clay, shale, hardpan or frozen ground

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Road-Master

SPREADER • DITCHER •

SNOWPLOW is the

work-tested answer to your

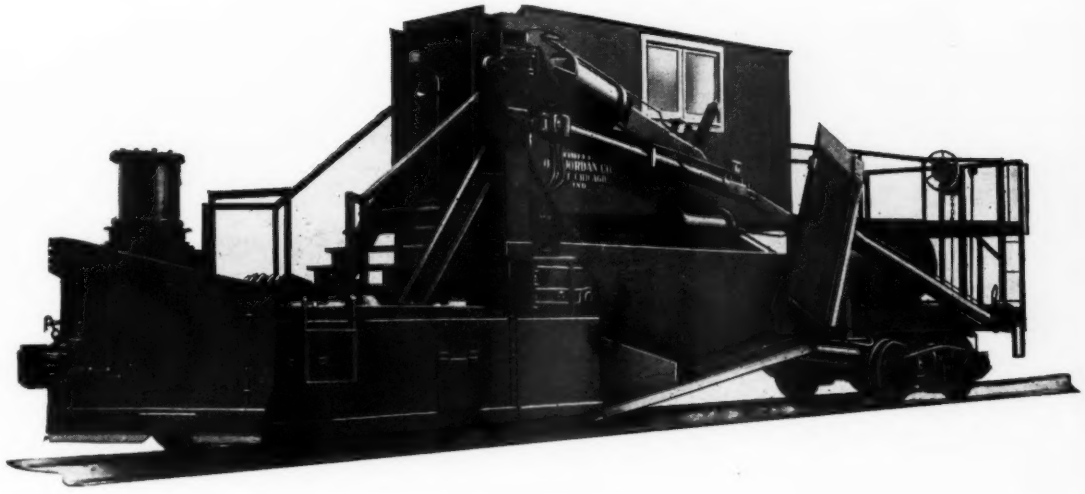
roadbed maintenance and

snow fighting problems . . .

When you see the Jordan

ROAD-MASTER in action

you'll know why so many rail-



road people are talking about it

. . . You'll see why they say "It

does the work of an army of men."

Full information is available on request.

Write to O. F. Jordan Company,

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Road-Master

No. 271 of a series

Railway Engineering and Maintenance

SIMMONS-BOARDMAN PUBLISHING CORPORATION

79 W. MONROE STREET
CHICAGO 3, ILL.

Subject: Reprints of Articles

July 1, 1951

Dear Readers:

From time to time many of you have received from manufacturers pieces of literature consisting of articles reprinted from the pages of this magazine. You may be interested in having some background information regarding why these reprints happened to be made and sent to you, and how frequently articles from this magazine are reprinted.

It happens that, of necessity, some of our feature articles deal with developments in which proprietary products—machines, materials or devices—are employed in such a manner as to promote efficiency or to obtain some other advantage. Frequently, as part of their sales effort, the manufacturers involved wish to send out special mailings of reprints of such articles to railway officers having a particular interest in the applications described. The desired number of reprints is then ordered from the publisher who directs the printshop to run them off from the original type. Occasionally, however, orders for reprints come in after the pages of type have been broken up, in which event satisfactory reprints may be made from tear sheets by the so-called planograph or offset process. Generally speaking, the publisher is happy to cooperate in providing reprints, with the understanding that a "credit line" will be shown, naming the magazine as the source of the material.

There is no intention on the part of the publisher to make a profit on this reprint business. It is regarded solely as a service which the company is glad to render for the benefit of the manufacturers. The charge made in each case is the actual cost of the reprint plus a nominal figure to cover the cost of handling.

You may be surprised to learn how frequently articles appearing in this magazine are reprinted. From the 12 issues up to and including the June, 1951, number, a total of 25 feature articles was reprinted, an average of slightly more than two per issue. The aggregate number of reprints ordered came to 45,000 copies, or an average of 1,800 copies of each reprint. In each of two instances 10,000 copies were ordered. In another case the order was for 7,500 copies. Otherwise, the number of copies ordered of individual reprints ranged all the way from 25 to 2,500.

Naturally, the fact that reprints of our articles are in such great demand is a source of considerable satisfaction to the members of the editorial staff. To us the number of reprint orders received is one measure of the esteem in which our work is held by others.

Yours sincerely,

Merwin H. Dick

MHD:ag

Editor

OUTSIDE: It's a beauty Extra-heavy Streamlined MONITOR-TYPE CAB! 360° visibility! All controls conveniently located; all machinery fully protected from the weather, yet accessible. New CLEAR VISION BOOM. 14 inch safety clearance between car body and upper works.

BROWNHOIST Diesel Electric Locomotive-Cranes combine good exterior design with many basic mechanical improvements.

INSIDE: It's really engineered New DYNAMATIC CLUTCH gives smooth, sensitive 32-step control, banishes slippage, eliminates torsional impulse and vibration. Safe FRICTION CLUTCH BOOM HOIST driven by worm and wheel in oil bath. Twin-barrelled, extra-large boom-hoist drums take all line in one layer. New Wide-faced Hoist Drums mounted on roller bearings with air cylinder mounted within the drum. ELECTRIC ROTATION and electric travel reduce maintenance to a minimum. Optional features include 8-WHEEL CHAIN DRIVE for increased drawbar pull and TWIN ENGINE DRIVE where greater tractive effort is required.

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BROWNHOIST

INDUSTRIAL BROWNHOIST CORPORATION, BAY CITY, MICHIGAN

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Fairmont

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AND WORK EQUIPMENT

. . . designed for today

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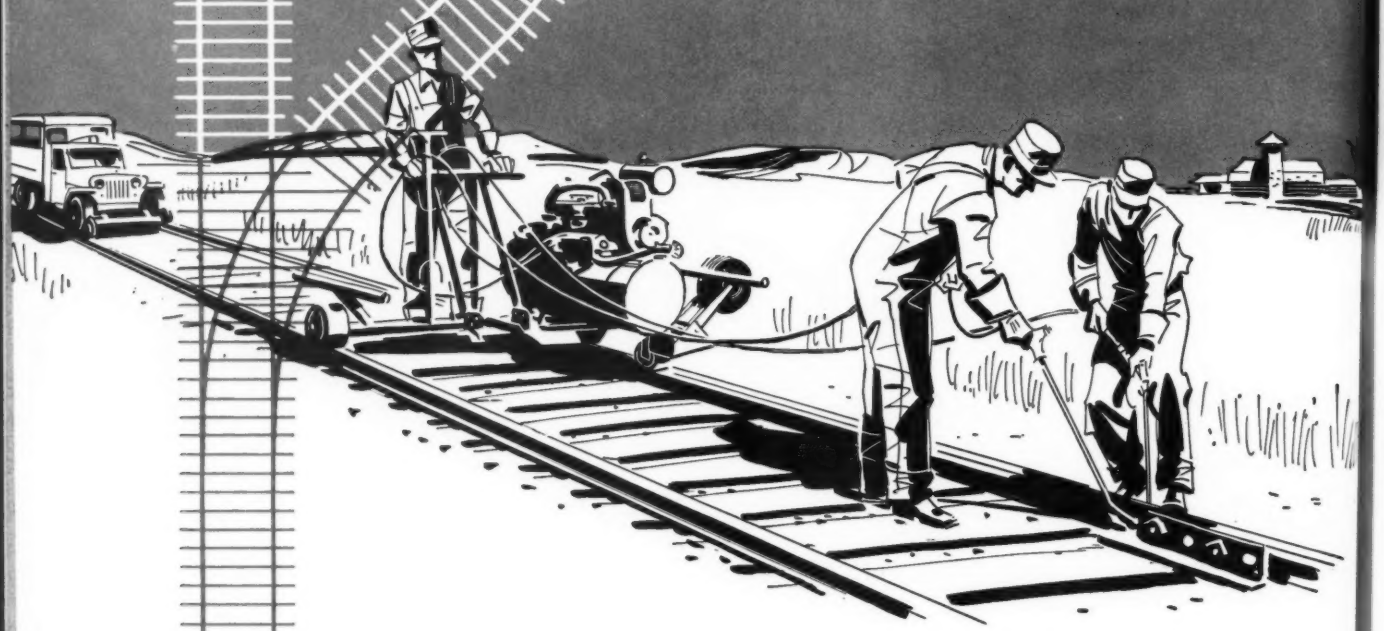

Performance
ON THE JOB
COUNTS

Constant improvement, constant redesigning to meet the maintenance needs of today—and of tomorrow—are part of a 40-year Fairmont tradition. A good example is the new Fairmont Quick-Clear Oil Sprayer (W72 Series A). This unit sprays heated oil, under pressure, on both sides of angle bars and switches. This new unit is much lighter in weight than other sprayers and is equipped with pneumatic set-off wheels for easy, fast removal from tracks. This adds greatly to operating efficiency especially in sections where railroad traffic is rather heavy. Into this specialized unit have been built all the best ideas of sound design, as well as the finest functioning parts—and something more—the reputation of Fairmont for building with an *eye to the job* and to the necessity of dependable operation at the lowest possible cost—always.

FAIRMONT RAILWAY MOTORS, INC., FAIRMONT, MINNESOTA

Railway Engineering and Maintenance

NAME REGISTERED U. S. PATENT OFFICE

Published on the first day of each month by the

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PRINTED IN U.S.A.

VOL. 47, NO. 7 JULY, 1951

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Finds Precast Wall Slabs Reduce Building Costs ---------- 625
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How Track Is Raised and Reballasted in Sweden ---------- 628
Describes an unusual method in which, first, a "dig-out" plow and then a "track-raiser" is dragged under the ties by a locomotive

Builds and Tests Prestressed-Concrete Trestle Slab ---------- 631
Describes the design, construction and performance under load of a concrete member compressed by stretching cables encased in it

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How to Surface Welded Track Safely — How to Maintain Cathodic Systems

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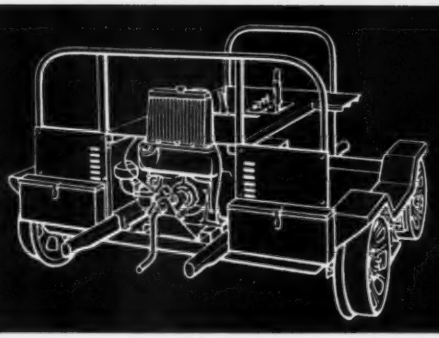
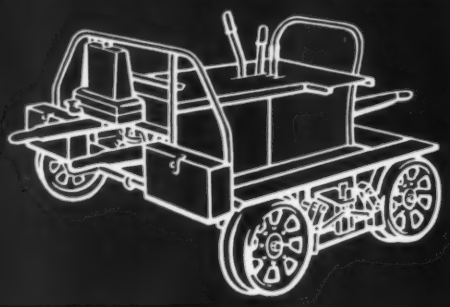
More safety—more efficiency
— in the new Model 101 inspection car. Four speeds forward, three reverse, with *immediate* reverse attainable without reversing engine. Wheel silencers, rear lifting weight of 98 pounds. Carries four men in comfort — with speed and safety.





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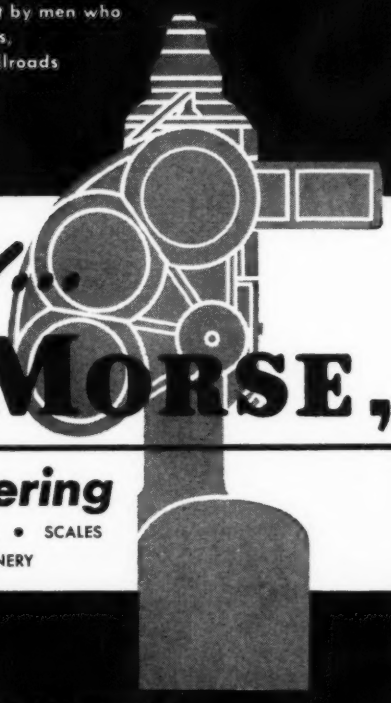

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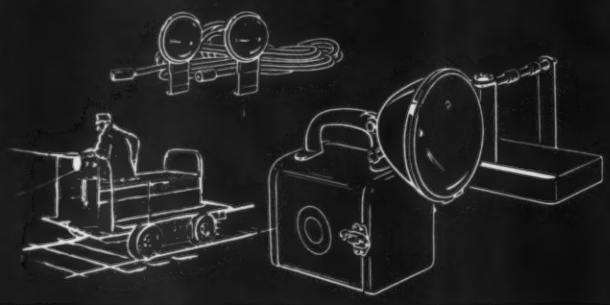

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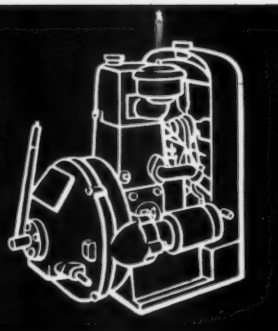


M/W Men—

Can Help Preserve Free Enterprise

Every maintenance-of-way supervisory officer, whether he realizes it fully or not, is obligated to do whatever he can to insure that his employing road will earn an adequate net income. So obvious is this fact that it may seem unnecessary to call attention to it. Yet it is not difficult to understand that some of these officers may have the viewpoint that they would not be greatly affected if their companies were forced into bankruptcy. The road would still have to be kept in operation and maintained (so it can be reasoned), and if the railroads as a whole were to become so weakened financially that they could no longer pay their operating expenses, then the government would take them over and everybody would be happy, except of course the taxpayers who would be footing the bills.

It is not difficult to find the "fly in the ointment" in this line of reasoning. Those who subscribe to it are playing directly into the hands of the groups who are endeavoring to undermine our system of free enterprise and personal freedom. Federalization of the railroads is an essential step if the objectives of these groups are to be achieved. Hence, every thinking person, with the welfare of his family, especially his children, at heart, cannot help but feel impelled to fight with all his might to protect the solvency of the company for which he works.

It is true that the battle seems in some respects to be one-sided. For one thing, the railroads are burdened with unfair regulative practices, while their competitors enjoy substantial subsidies from the government. For another, the railroad brotherhoods, by their rapid-fire demands for pay increases and to get pay for work not performed, seem to be engaged in a determined effort to force the railroads into bankruptcy and thence into the hands of the government.

In view of these adverse circumstances working against them, maintenance men must be on their guard against a feeling of defeatism in their efforts to hold costs down and thereby to do their share in helping to keep their companies in the black. Many a valiant struggle is now being waged to this end. For instance, on one road, a gang of 90 men, with the aid of many items of power equipment, including several home-made machines of recent development, is doing more track-raising and tie-renewal work than was done by a gang of 180 men ten years ago. That progress is still being made in the direction of greater efficiency on this road is indicated by the fact that, with about the same amount of work being done, a reduction of 34 per cent in the number of man-days expended in carrying out maintenance operations was effected in 1950 as compared with 1949.

It is reasonable to assume that the time will eventually come when further important reductions in maintenance costs, either through improved construction or greater efficiency, will not be possible. But this time is a long way in the future on most, if not all, roads. Meanwhile, the most important contribution that the maintenance man can make in the battle to preserve the free enterprise system is to concentrate his skill and energy on the problem of combating rising costs.

RAIL FASTENINGS—

Make Sure Distribution Is Safe

WITH almost two millions tons of rail programmed for laying this year, the railroad lines of the country are now literally "threaded" with strings of new steel awaiting installation. Beside each string of rail lies its "fastenings", comprising bolts, spikes, joint bars, anchors, tie plates, etc.—all awaiting the arrival of the rail-laying gang. The details of handling the distribution of these fastenings comprises a subject regarding which there is considerable controversy.

Almost all railroads unload their new rail prior to the arrival of the rail-laying gang. Most of them unload the rail fastenings at the same time, striving to get them as near as possible to the actual point of use. Some, however, do not make this distribution until shortly before the start of the rail-renewal work. In either case, it is natural that some redistribution will be necessary directly ahead of the rail-laying operation, particularly of the small materials that might otherwise be easily lost in the ballast. Methods of distributing these materials vary somewhat on different railroads.

However, there are two distinct schools of thought with reference to methods of distributing these materials, particularly tie plates, with the proponents of each school disdaining to accept that of the other. Most of the controversy revolves around the question of safety. One faction claims that tie plates, and other material as well, should never be left within the limits of the ties, claiming that this practice is unsafe. The opposing faction says it is not.

The first faction points, in retrospect, to those few accidents and sometimes near catastrophies that occur each year, in which a train strikes tie plates or other track materials that have been left, usually overnight, between the running rails or on the ends of ties.

In support of their position members of the second faction have contended that such accidents were caused by track fastenings placed on the rails by trespassers, and have sometimes supported this contention with confessions. However, when the first group asks, "But what about those other cases in which no confessions were obtained?", the second faction retorts that the special agents just couldn't find the culprits.

Be all these claims and counter claims as they may, is the saving realized by placing tie plates and other material between the rails or on the ties far in advance of use worth risking even one small accident? The consensus is that the risk isn't justified. Therefore, until it has been proven by scientific research that a combination of unequal air pressure and track vibrations caused by fast, low-slung diesels and streamliners can never flip track material under the wheels of a train, would it not be wise to follow the basic safety rule that "when in doubt, take the safe course"? If that course becomes universal, trouble will be averted, lives may be saved, property damage lessened—and rail allotments will undoubtedly still be completed.

HIGHWAY CROSSINGS—

Deserve Attention Ahead of Surfacing Work

MOST railroads go to great expense in installing well-conceived drainage systems, new ballast and crossties, large tie plates, welded rail and long-wearing road surfaces at primary road crossings, but observation indicates that the successful consummation of out-of-face surfacing work is being placed in jeopardy in some instances by failure to apply the rudiments of good crossing construction at road crossings.

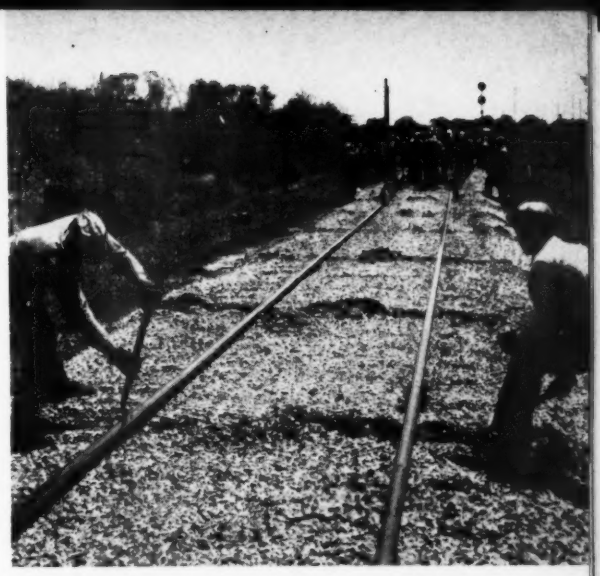
It is not to be expected that the surfacing gangs will take the time that would be required at these crossings to give them the same durability as the open track. These gangs will accord trackage through highway crossings, farm crossings and motor-car set-offs the same raising and surfacing treatment given to open track. This open-track treatment would be satisfactory —in fact desirable—if the track through the crossings had the same opportunity for free drainage as the open track. But normally it does not, and furthermore is subject to vehicular as well as train traffic. For these reasons such crossings need additional treatment.

Some roads, recognizing the importance of improving secondary road crossings, have the section forces, or advance units of their surfacing gangs, dig out the ballast in the cribs, renew the crossties, apply large tie plates where necessary, and refill the cribs with fresh ballast through such crossings prior to the general raising and surfacing work. This is commendable practice, but is it enough?

Although adequate drainage is held to be essential at all grade crossings, it is an item of crossing maintenance that seems to be frequently neglected. However, unless a crossing is properly drained the track through it can hardly be expected to perform as well as the better-drained adjoining open track. Yet it would require but little more digging out to install perforated corrugated pipe or scrap flues along the ends of the ties and to provide good drainage outlets while the crossing is torn up for the installation of new crossties.

Many maintenance engineers have been striving for a long time to place their out-of-face surfacing work on approximately a five-year cycle. Thanks to the mechanized equipment now available this short cycle is now within reach on most roads. However, if the fruits of a general raising and surfacing project are to be realized over the full period between surfacings in the form of good riding qualities and reduced maintenance costs, it would seem that adequate attention should be given to the secondary grade crossings.

Under the direction of Foreman R. C. Sapp, advance unit of extra gang No. 8 makes tie renewals, straightens slewed anchored ties, skeletonizes and refills track at private and highway crossings, and unloads ballast



The surfacing or raising unit follows from three to eight miles behind the advance unit. Two men digging jack holes comprise the forward element of this gang

How the M. P. Gets More Track Surfaced

• By employing several Multiple Tampers and organizing special gangs around them to conform with the progress of these machines, the Missouri Pacific has been able to shorten the cycle of out-of-face surfacing. The railroad reports that, consequently, its track as a whole is smoother riding and more uniformly supported than was possible heretofore. Out-of-face surfacing work including the renewal and spacing of ties, gaging, unloading ballast, tamping, lining and dressing, is now being done on this road at a rate of 3 to 4 track ft. per man hour. To the economies that this rate

As the Multiple Tamper approaches, Sam Cannon, foreman of extra gang No. 10, sights ahead on the spotboard

Four trackmen work with Multiple Tamper—two nipping ties and two feeding ballast to the tamping blades

Two men fill in voids under tie centers with hand-held vibratory tampers, extension cords of which are plugged into outlets provided on the machine

represents must be added the overall savings in maintenance of track fastenings, ties and rail incident to the improved condition of the track.

Performance Doubled

Formerly, out-of-face surfacing on this road was done by small gangs of about 25 men, which averaged on primary lines about three-quarters of a mile of completed track a month. On this basis, three such gangs would complete about two and one-quarter miles of track a month. In contrast, surfacing gangs of about 65 men, including a machine operator and helper, as now organized around the Multiple Tampers, will complete from four to eight miles in a month, depending upon the number of tie renewals, the amount of raise, and the number of train interruptions. Moreover, the progress reported for the former gangs is on the basis of 25 working days a month as compared with the 21 now obtaining.

Beginning in 1948 with the first purchase of Multiple Tampers, the Missouri Pacific now possesses 16 such machines. It is believed that these machines will enable the road to maintain a surfacing cycle for most economical maintenance. Formerly, while a relatively larger number of small gangs were employed in out-of-face surfacing, their combined accumulated progress precluded the shortening of the average surfacing cycle to less than 9 or 10 years.

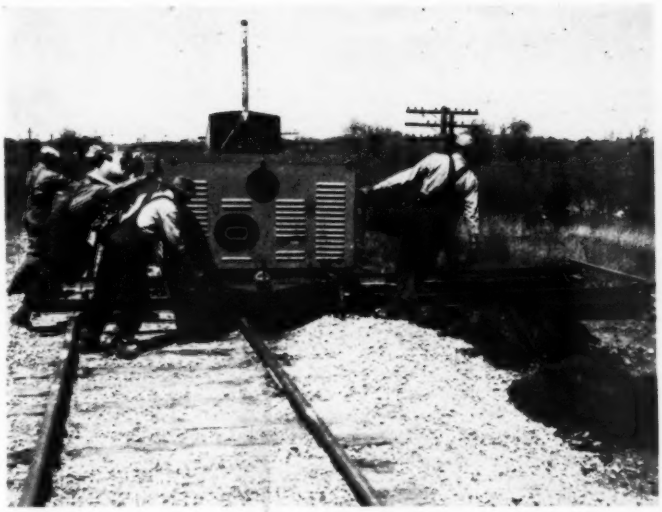
Generally, each out-of-face surfacing gang as now organized is divided into three work units. The first unit, known as the advance or head gang, consists of a foreman and about 16 men who make tie renewals, space and straighten slewed anchored ties, gage track, and unload ballast. The second unit, known as the surfacing gang, works from three to eight miles behind the head gang, and includes the Multiple Tamper. This unit consists of a foreman, an assistant foreman, a roadway machine operator and helper, and 32 men who raise, line and tamp the track. The third unit, known as the equalizing gang and working from one to three miles behind the second unit, consists of a foreman and about 15 men, who equalize the ballast, clean the tops of the ties, dress the cribs, and "tail up" the ballast shoulder.

One of the heavy surfacing gangs visited was on Roadmaster Toy Payne's territory on the Eastern division, and is designated as surfacing gang No. 8. This gang produces about 1,960 ft. of finished track a day, or the equivalent of almost seven and one-half miles a month. Train interruptions are not too frequent here, averaging about three passenger and three freight trains daily during the working hours. The track is cleared in advance of the arrival of the passenger trains and two "red-ball" freight trains, but occasionally the other freight train is flagged to permit the Multiple Tamper and gang to work until the train is sighted, after which the machine is removed from the track at a convenient set-off location, and a surfacing run-off made. Trains operate on a 20-m.p.h. restricting order where the gangs are working.

The advance unit of this gang was under the supervision of R. C. Sapp, extra gang foreman. Ties are renewed with No. 4 or No. 5 treated oak crossties, 8 ft. 6 in. long, by the digging-in method. A careful inspection is made of each tie marked for renewal before it is actually removed. In general, this unit is comprised of two men digging cribs adjacent to the ties to be renewed; one man pulling spikes from ties marked for removal and peddling new spikes where needed; four men removing old ties, piling them, and straightening the anchored ties; two men renewing ties; two men shovel-tamping ties to base of rail; one man applying tie plates; two men spiking new ties; one man refilling cribs, dressing, and firing tie piles with gathered weeds and brush, and one man replacing anchors at straightened ties.

The head unit progresses at the rate of about one-half mile a day while engaged solely in renewing ties. However, other duties are generally performed which prevent it from maintaining this pace. To be specific, it also gages track, lines track on curves to stakes previously set by the engineering party, skeletonizes and applys fresh ballast wherever pumping joints, motor-car set-offs, and highway and private crossings are encountered, renews ties through the highway crossings, applies large tie plates where necessary, and unloads ballast at the rate of about 18 cars (totaling about 720 cu. yd.) to a mile.

The surfacing unit of gang No. 8 is under the super-



With the aid of four men, the roadway machine operator removes the machine from the track to a previously-prepared set-off within two minutes

The equalizing unit, under Foreman Turpin, follows from one to three miles behind the surfacing gang

vision of Foreman W. E. Harmon, assisted by Jack Watering. A part of this unit, working ahead of the Multiple Tamper, is comprised of two men digging jack holes; two men seating and raising the jacks; two men removing jacks just ahead of the Multiple Tamper and carrying them ahead; three men shoveling ballast from the ties to the cribs; one man working the level board (and also setting the spotboard); four men spacing ties, including two with tie-spacer tools and two shoveling ballast; and four men nipping ties and shoveling ballast for the tamper. Working immediately behind the machine, two men fill in the tie centers with vibratory tie tampers, the extension cords of which are plugged into receptacles on the Multiple Tamper. The two hand-held tampers are used merely to hasten the distribution of the ballast in the voids under the tie centers and do not tamp these areas. Behind these men are three others with track shovels and ballast forks filling in the cribs and smoothing ballast between the rails; five men lining track; and one man adjusting rail anchors and driving down spikes. In addition, there are a water boy and two flagmen with this unit.

Foreman Harmon is on his knees most of the time sighting across the raising blocks to the spotboard and directing the men on the raising jacks. This gang is raising the track about 3½ in. and uses 16 aluminum track jacks which, on the rail length immediately ahead of the tamping machines, are set at about eight-foot intervals. Farther ahead the pairs of jacks are placed about three-feet from each joint location. The men carrying the jacks forward have their work timed with the progress of the tamping machine, dropping the jack latches and removing the jacks just as the machine is moving forward to tamp the crib in which the jacks are set. With this spacing and handling of the jacks, Foreman Harmon obtains a smooth surface.

The Tamping Machine

The operator of the machine lowers and raises the tamper crosshead several times until a tie is thoroughly tamped. The number of tamper insertions depends upon the amount of the lift and the character of the ballast material. The operator notes the penetrating progress of the tamping blades and is governed by what he calls the "feel" of the machine. On this particular job the operator first lowers the tamping blades to the desired depth and then, instead of making a full withdrawal of the blades, raises them about two or three inches before lowering them again, much like a trackman shovel tamping. This raising and lowering is done quickly for about seven times, before the machine is moved to the next tie.

In this connection, it was noted that some foremen prefer the machine operators to make only four or five insertions but to completely withdraw the tamping blades from the ballast after each insertion so that, with the lowering of the blades, a larger amount of ballast is carried forward. No hard-and-fast rule concerning this phase of the work has been promulgated, the policy being to permit each division to select its own practice so long as a smooth, uniformly-tamped track is produced.

Clearing for Traffic

When clearing the track for traffic, the operator of the Multiple Tamper raises the crosshead and, taking along four men, runs to a previously-prepared set-off. Within about two minutes these men have the machine blocked up on the portable rails of the set-off. The set-off itself is constructed of cross and switch ties at the beginning of each day's work, and requires about seven minutes to build.

The maintenance of the machine is handled by the operator and his helper. This work consists of keeping the unit oiled and in good adjustment. These men are also qualified to rivet new tips on the tamping blades and to replace worn blades when necessary.

Equalizing Unit

The equalizing unit of this surfacing gang is under the superviison of Foreman F. G. Turpin, who prefers to have his unit known as the "equalizing gang" instead of the "dressing gang." His reason for this attitude is that the term "dressing" implies spending time on refinements that are not essential to good maintenance. His men are distributed as follows: four men using a

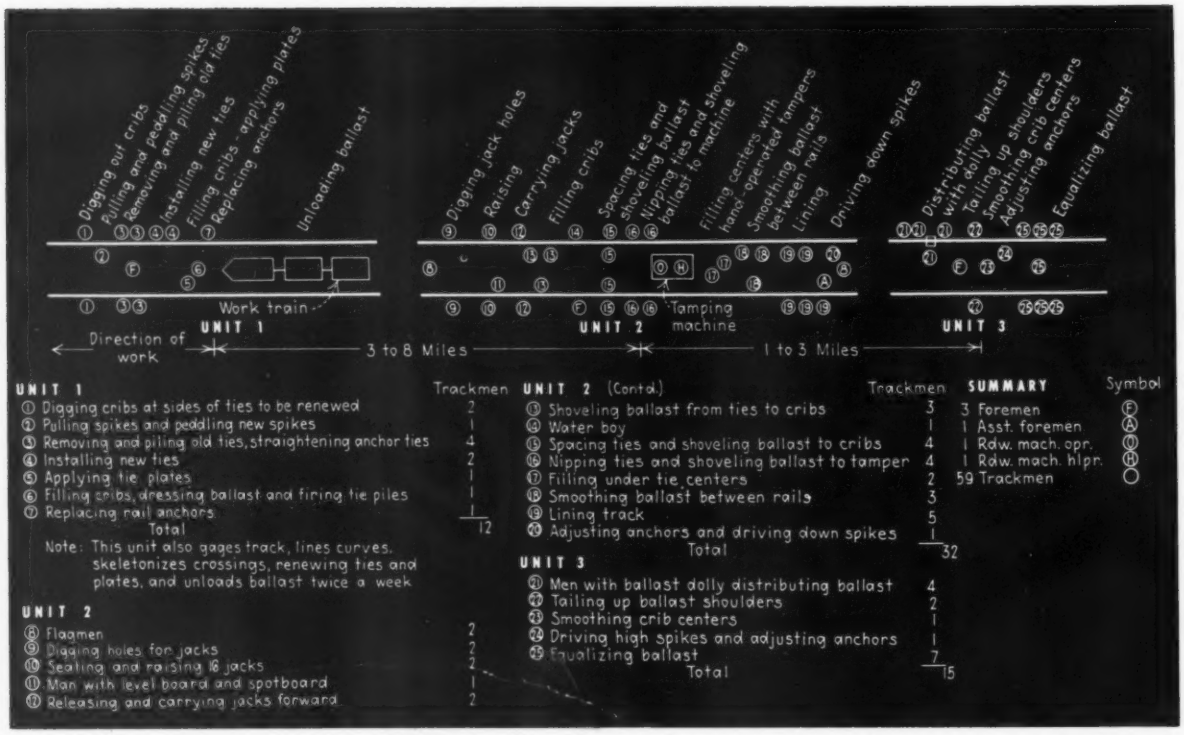

Digging out cribs
Pulling and pedalling spikes
Removing and piling old ties
Installing new ties
Filling cribs - applying plates
Replacing anchors
Unloading ballast
Work train
UNIT 1
Direction of work
3 to 8 Miles
Digging jack holes
Raising
Carrying jacks
Filling cribs
Spacing ties and shoveling ballast
Nipping ties and shoveling ballast to machine
Filling centers with hand-operated tampers
Smoothing ballast between rails
Lining
Driving down spikes
Tamping machine
UNIT 2
1 to 3 Miles
Distributing ballast with dolly
Tailing up shoulders
Smoothing crib centers
Adjusting anchors
Equalizing ballast
UNIT 3
UNIT 1 Trackmen
① Digging cribs at sides of ties to be renewed 2
② Pulling spikes and peddling new spikes 1
③ Removing and piling old ties, straightening anchor ties 4
④ Installing new ties 2
⑤ Applying tie plates 1
⑥ Filling cribs, dressing ballast and firing tie piles 1
⑦ Replacing rail anchors 1
Total 12
Note: This unit also gages track, lines curves, skeletonizes crossings, renewing ties and plates, and unloads ballast twice a week
UNIT 2
Ⓐ Flagmen 2
⑨ Digging holes for jacks 2
⑩ Seating and raising 18 jacks 2
⑪ Man with level board and spotboard 1
⑫ Releasing and carrying jacks forward 2
UNIT 2 (Contd.) Trackmen
⑬ Shoveling ballast from ties to cribs 3
Ⓒ Water boy 1
⑮ Spacing ties and shoveling ballast to cribs 4
⑯ Nipping ties and shoveling ballast to tamper 4
⑰ Filling under tie centers 2
⑱ Smoothing ballast between rails 3
⑲ Lining track 5
⑳ Adjusting anchors and driving down spikes 1
Total 32
UNIT 3
㉑ Men with ballast dolly distributing ballast 4
㉒ Tailing up ballast shoulders 2
㉓ Smoothing crib centers 1
㉔ Driving high spikes and adjusting anchors 1
㉕ Equalizing ballast 7
Total 15
SUMMARY Symbol
3 Foremen Ⓕ
1 Asst. foremen Ⓐ
1 Rdw. mach. opr. Ⓒ
1 Rdw. mach. hlpr. Ⓗ
59 Trackmen ○

Chart Showing organization of a Multiple-Tamper gang on Eastern division of the Missouri Pacific, as described in this article

one-yard ballast dolly move surplus ballast to locations where it is needed; two men tailing up the ballast shoulders; one man smoothing crib centers; one man tapping down high spikes and adjusting rail anchors; and seven men equalizing the ballast and making any required refinements to the lining and surfacing to produce a finished track.

When the advance gang runs into heavy tie renewals, as at several highway crossings, which slows up its progress, the roadmaster moves up men from the equalizing gang to help out temporarily. No men are temporarily taken from the Multiple Tamper gang for any purpose, as this is the pace-making unit of the whole gang, and any labor withdrawal would naturally disturb the equilibrium of the operation.

Four of the equalizing units of the heavy surfacing gangs on the Missouri Pacific use a Fairmount ballast drainage unit from which the disks and dragging blade have been removed and a ballast-shaping open-ended box contrivance substituted. This shaping box has a diaphragm midway in its length, which serves to carry surplus ballast along with it and to deposit the material where it is needed.

Ballast used on the Missouri Pacific is relatively small in size and does not include stones larger than 1½ in. The types of ballast used include Miami "B", which is a coarse chat; trap rock, a quartzite material; tiff tailings, from barite mines; smelter slag; and crushed gravel. The ballast is shipped in ordinary hopper cars and, when unloaded, is leveled by a crosstie which is dragged along the rails in front of the rear truck of the car. A pair of scrap joint bars is fastened to the bottom of this crosstie so that the ballast between the rails will be spread to a level below their running surfaces.

The surfacing gangs are housed in camp cars. The sleeping cars are former Pullman cars which the road purchased early in 1950 and fitted with steel bunks and lockers for sleeping 24 men each. In addition to the sleeping cars, the camp outfit includes a kitchen-diner, a foreman's car, a tool car, a flat car carrying coal and miscellaneous material, a store car, a bath car, and a water car. Since a considerable quantity of water is required, a composite water car was devised which has a capacity of 30,000-gal. This car consists of two locomotive tenders joined together with a permanent connection in such manner that the end drawbars and couplings, normally at the rear of each tender, provide standard couplings at the ends of the composite car. The large capacity of these cars, which compares with 6,000 to 10,000 gal. for the upright and horizontal tank cars formerly used, greatly increases the intervals between refillings.

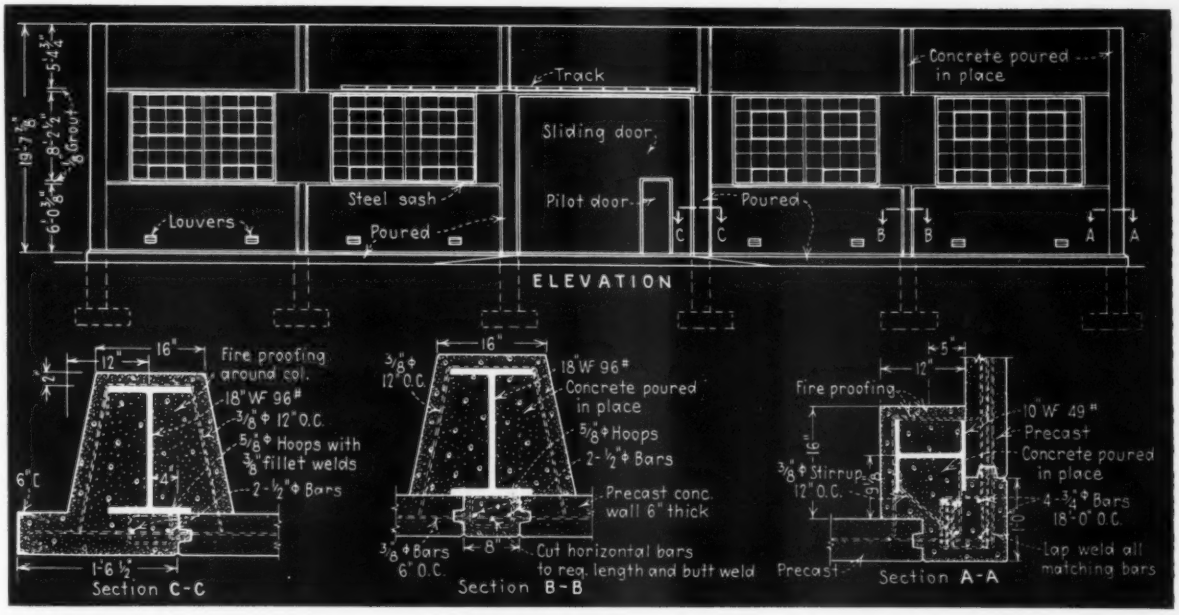
A highway truck is assigned to each extra gang and serves, in addition to hauling materials and supplies, as a supplement to motor cars and trailers in transporting the men to and from work.

No Backward Movement

These heavy surfacing gangs were equipped and organized by district and division maintenance officers under the general direction of A. B. Chaney, assistant chief engineer—maintenance. The organization of each of these gangs is such that the rate of progress of all elements is geared to the speed of the Multiple Tamper, which thus becomes the pace setter. Another feature is that all men in the gangs are continually moving forward. The absence of any backward movement has raised the **espirit de corps** of the gang, as each man is cognizant that what he is doing counts and that, if he falls down on his individual job, the progress of the machine and of the entire gang is affected.

In constructing a building for use as a garage for railroad automotive equipment the concrete wall slabs were precast directly on the poured-in-place floor of the structure, and then lifted into position with a crane. This article gives details of the design of the building, tells how the casting and erection work were carried out, and points out the advantages that were realized by using this method.

Considerable economies were effected in construction of this building by using precast concrete slabs for the exterior walls. Construction details are shown below



Finds Precast Wall Slabs Reduce Building Costs

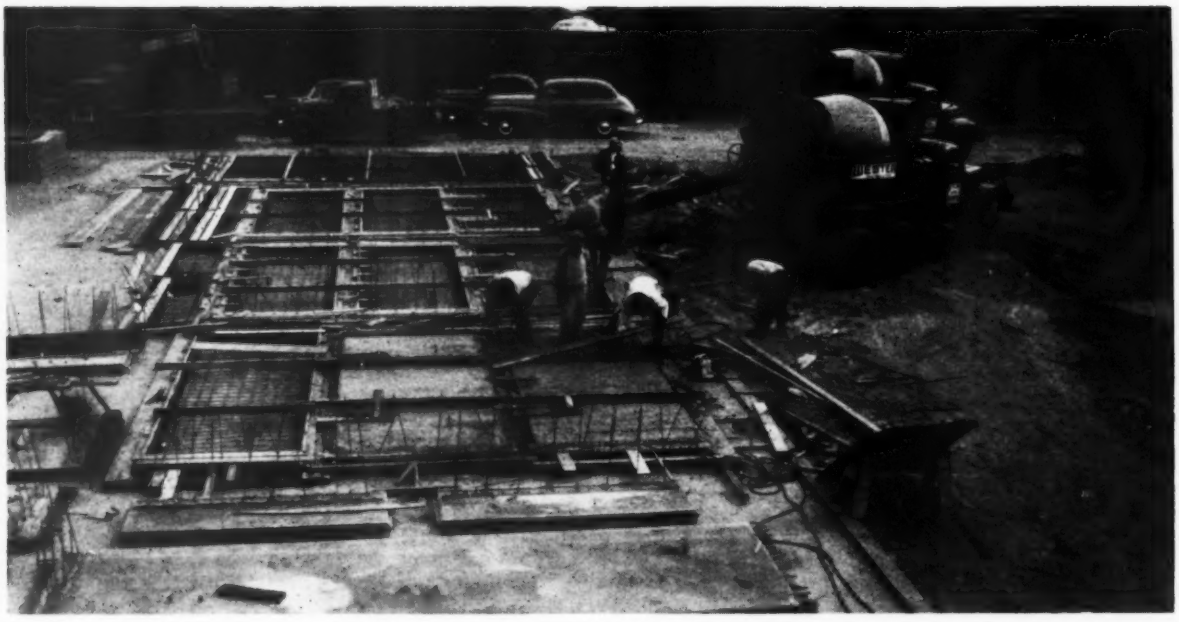
By L. E. PEYSER

Architect, Southern Pacific
San Francisco, Cal.

• In the relatively short history of modern reinforced concrete the engineering of this material has approached an exact science. Recent study and developments in its use in buildings have emphasized the necessity of finding methods whereby economies would be effected in the completed structure. This led to thought as to how formwork, which had added very considerably to the cost, might be materially reduced, how it could be simplified and schemes developed for reuse after simplification.

Probably the most interesting result of this line of thought has been the development of precast sections in relatively large units for placement in position, either by lifting, using mobile crane equipment, or by the so-called "tilt-up" method, rather than pouring the concrete in place in forms of elaborate and costly construction.

In the recent construction of a building to be used as a garage for servicing railroad automotive equipment the former method was decided upon on the basis of economical construction meeting with local requirements for this type of occupancy. The requirements of the Building Code of the city in which the building was erected are quite severe, both as to fire resistance and on account of its being in an area where earthquakes occasionally occur. Voluminous engineering calculations were required, even including such details as the reactions in the slabs during the lifting operations. The



The concrete wall slabs were precast in simple wood forms constructed on the poured-in-place concrete floor of the structure

completed design met all these requirements.

The building is 94 ft. by 80 ft. in floor area and 18 ft. 6 in. in clear height. The frame consists of four rigid steel-frame bents having a clear span of 77 ft. 6 in. and placed at 18-ft. 5-in. centers. The roof is of wood-frame construction sheathed with 2-in. tongue-and-groove material and covered with built-up felt and asphalt roofing.

Due to conditions obtaining at the site and to conform with local building requirements it was necessary to cast in place the concrete foundations and periferal retaining walls up to the floor level. Exterior walls above this are precast slabs and have a considerable area of steel sash.

Upon completion of the foundation, the concrete floor slab was placed on a compacted fill and sprayed with a curing coating having a wax content. So as to provide a surface that would prevent adhesion of the wall units cast upon it this coating was applied in greater amount than would ordinarily be used if it were solely for curing the concrete.

Construction of Forms

The forms for the wall slabs were constructed on the concrete floor, the area of which was sufficient to permit all slabs to be poured at one time. The largest units to be constructed were 5 ft. 10 in. wide and 25 ft. 9 in. long, and all the slabs were to be 6 in. thick. The forms consisted merely of 2-in. by 6-in. wood members placed on edge. They were drilled as required for the passage of those steel reinforcing members which extended beyond the edges of the concrete. Milled wood members were placed to form reglets for the installation of steel sash and to form tongues and grooves around the edges of the slabs for grouting the joints. All the forms were carefully detailed to exact dimensions, since but ⅛ in. tolerance between slabs was allowable.

Projecting eyebolts, to be used for raising the slabs, were welded to the reinforcement, and were so installed that after the slabs had been set in final position the bolts could be unscrewed and removed and the resulting holes plugged with cement mortar. After erection of the slabs, the horizontal reinforcing members projecting from them were welded to rings of reinforcing steel that had previously been welded to the structural steel columns.

Since the concrete floor formed the bottoms of the forms, dependence was placed on this surface to provide a suitable surface for the exterior of the building. Great care was taken to vibrate the concrete thoroughly and to maintain the reinforcing steel exactly in position.

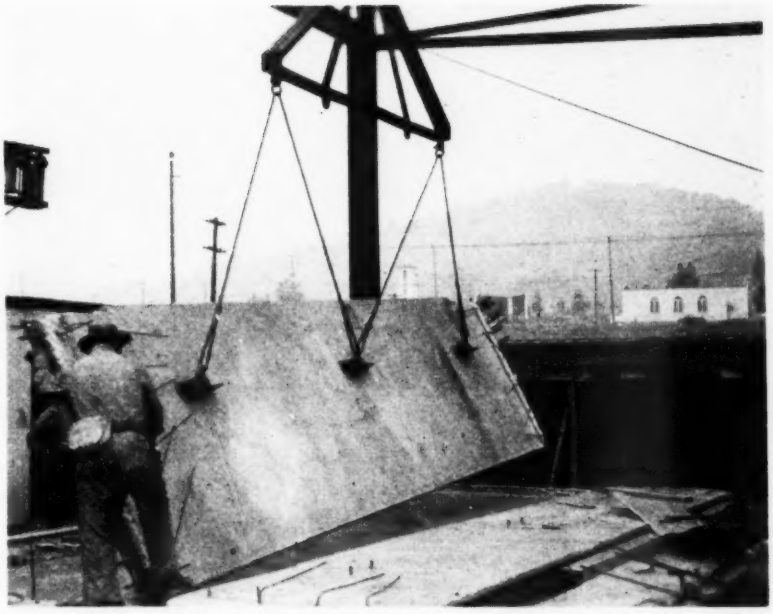
The upper exposed surfaces of the slabs, which, after placing, would be on the interior of the building, were screeded to a plane surface and floated to a sand finish. The slabs were sprayed with the same curing coating referred to above. During the time the casting work was in progress the steel frame was erected and the wood roof construction completed.

The only poured-in-place concrete used in the superstructure was the fireproofing of the steel columns, as required by local regulations, and four corner columns. This concrete was placed after the wall units had been erected.

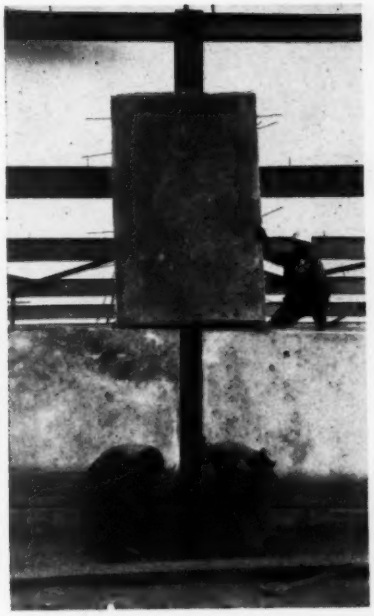
No Difficulties Experienced

The precautions taken to provide a coating on the floor slab that would prevent adhesion gave excellent results, and all slabs were readily lifted without loss. After erection only a minor amount of pointing up was required at a few places on the edges of the slabs. At certain of the joints between slabs where there was possibility of leakage, particularly the joint between floor and the first tier of slabs above, mastic was forced in prior to pointing up.

While we had considered applying a cement dash finish to the exterior upon completion the appearance was so satisfactory that this was not done, resulting in considerable economy. However, in loca-

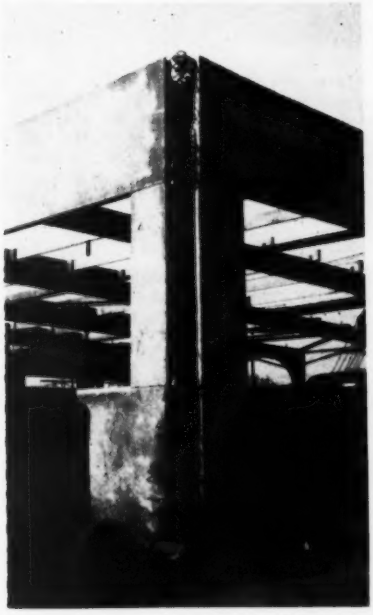


The eyebolts used for raising the slabs were so installed that after slabs had been set in final position, the bolts could be unscrewed and the resulting holes plugged



Prying reinforcing apart to allow vertical bars of upper slab to slip into place

Positioning the final precast slab for the south wall. All slabs were carefully constructed to exact dimensions, as only ⅛ in. tolerance between them was allowed



Concrete for corners of building was poured after wall units had been erected

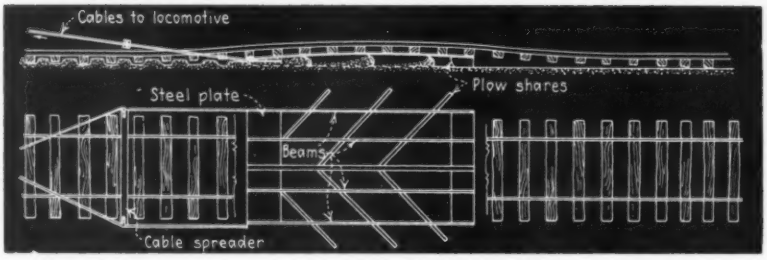
tions where appearance might be of considerable importance either a paint or stucco finish could be applied since the wax in the curing compound disappeared from the surface of the concrete as a powder in a short time.

The appearance of the structure is excellent. Also, compared with structures of other types, it is apparent that considerable economies were effected. The possibilities for further development of this type of construction are great and considerable study is being given to it by numerous engineers. Structures have been erected wherein wall units two stories in height, with precast columns and girders, were used.

An interesting case was one where a considerable number of identical units was required. One set of forms was constructed for each type and the first units cast. One day later the upper surface of the concrete was treated, the forms loosened and raised and the second unit cast directly upon the first. This was repeated as required, necessitating the use of only one form for each design unit. Large economies may thus be realized, particularly where the form is somewhat complicated.

It is believed that the type of construction described in this article will afford excellent fire resistive railroad facilities.

Above—As the first step in the new reballasting method developed in Sweden, a novel dig-out plow is pulled along beneath the ties. The plow shares force the old ballast to each side of the track, leaving a smooth bed on which the ties can come to rest behind the plow



Right—Construction details of the dig-out plow, which is pulled by the locomotive approximately at a walking speed

How Track Is Raised and Reballasted in Sweden

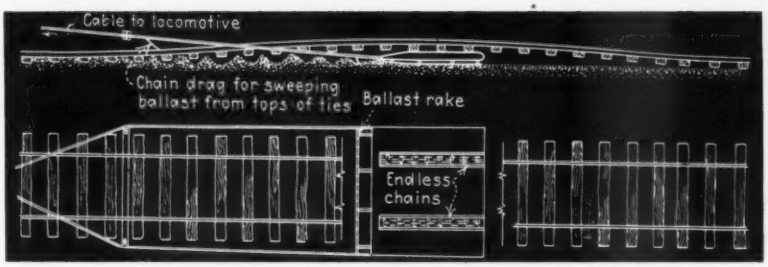
By **TORD FOGELBERG**

Division Engineer, Swedish State Railways
Nassjo, Sweden

Unusual method involves use of a locomotive as the power source. First, by pulling a "dig-out plow" beneath the ties, it removes the old ballast. Second, by pulling a work train, it distributes new ballast. Finally, by dragging a "track-raiser" under the ties, the track is raised, the tie bed is smoothed, and the track is lowered onto the new ballast.

• To make it possible to increase the speed of trains and at the same time reduce maintenance costs, the Swedish State Railways are presently providing better track drainage by employing a novel and economical method of replacing gravel ballast with crushed stone. This new system is made possible by the recent development of two devices—one to plow out the gravel ballast and the other to raise the track on crushed-stone.

When tracks have been reballasted in the past, the practice was to remove the gravel ballast from the cribs by hand and to replace it with crushed stone. The track was then lifted about 10 in., leaving the stone ballast to a depth of 18 in. below the bottom of the rails. The cribbing work was done with spades, shovels and picks. After



Above—After the stone has been distributed and leveled, the track raiser is dragged under the ties. This device acts as a wedge that raises the track while the ties ride on endless chains and a movable rake drags stone ballast into the troughs formed by old tie beds

Left—Construction details of the new track-raising device. With it up to 1.6 mi. of track can be lifted in two hours

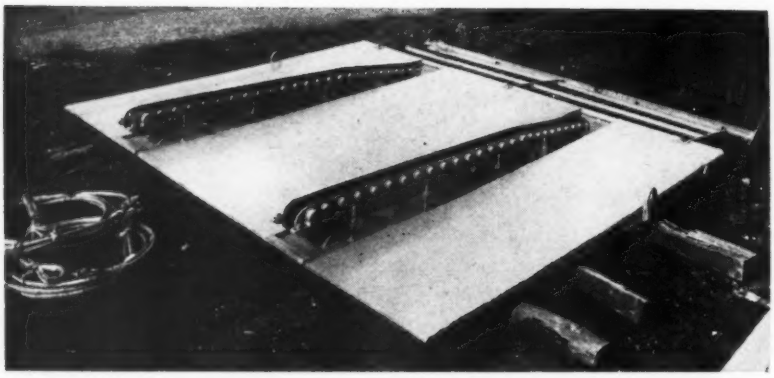
the track had been cribbed, it was raised on jacks and tamped with spades and "spits". This type of work is exhausting to the men and requires a large number of them to accomplish very much. In fact, the magnitude of the force required to do the reballasting in this manner meant that many of them had to be taken from other essential work or the force increased temporarily for the duration of the program. This is often quite difficult.

To improve this operation and reduce the manpower required, the writer undertook to develop a new labor-saving method of doing it. The final details were completed with the cooperation of Mr. Einar Stern, owner of the firm of Lindstroms Eftr., Malmo, and the resultant devices were patented. In the method developed a locomotive, the railroad's strongest worker, does the heaviest work. The use of a locomotive is feasible because one is usually available for some time on the site in connection with ballast distribution.

Removing the Old Ballast

As the first step in the new method, a newly-designed dig-out plow is placed under the ties to remove the old ballast. This device consists of four iron beams placed longitudinally to the track. At the forward end they are attached to a solid plate, 11 ft. wide. In the rear they are fastened to an iron box of the same width formed like a sleigh runner to smooth and compress the bottom. To these beams V-shaped plows are fixed to distribute the old material on the roadbed shoulders. To the front part of this device towing cables are attached for coupling it to a locomotive at such a distance that the latter does not interfere with the raising of the track. As the locomotive tows the dig-out plow forward, the track is progressively raised by the apparatus and the plow forced into the ballast by the weight of the track and the machine itself. Pulled along in this manner, the V-shaped plow shares force the ballast to each side of the track, leaving a smooth bed on which the ties can come to rest behind the device.

After the dig-out plow has completed its work and has been placed to the side of the track, crushed stone is distributed and then leveled to the height desired



Another view of the track raiser, showing the endless chains on which the ties ride

by a conventional track flanger, the plows of which have been lengthened to reach as far as the ends of the ties. To make it possible to push stone from the sides toward the center of the track, when that may be necessary, other special plows have been arranged on the flanger.

Raising the Track

To raise the track on the new stone another device is used. This consists of an 11-ft. by 16-ft. iron sheet with its fore part bent up like a sleigh. Two endless chains or tracks, running on rollers, are attached to the top of the sheet for supporting the track and facilitating movement when the device is placed under the ties in the same way as the dig-out plow. A movable rake is mounted on the nose of the track raiser to drag stone into the troughs formed by the old tie beds.

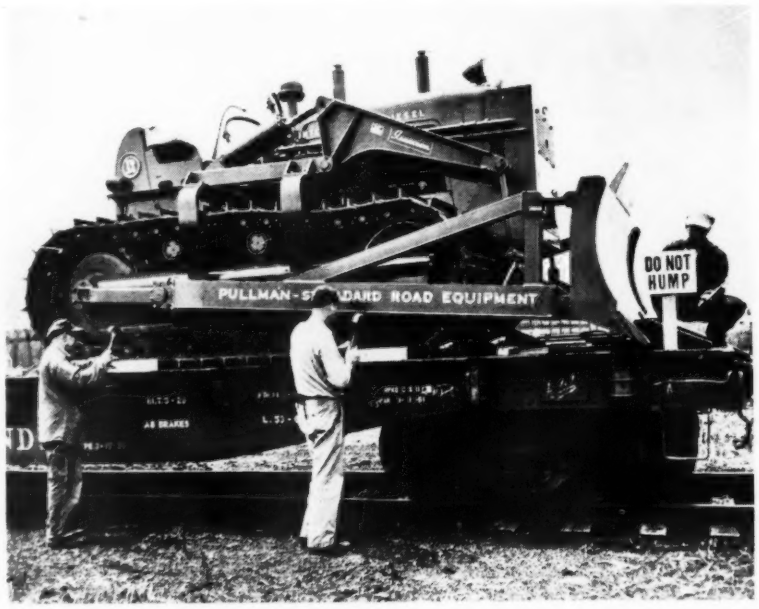
A locomotive also drags this piece of equipment which works as a wedge that raises the track up with the ties riding on the endless chains. As the device is pulled along, the sleigh-formed sheet successively climbs up on and compresses the stone under the weight of the track which gradually sinks down behind the "raiser" onto the bed of new stone. The track now lies lifted on the new stone, having been raised to a height directly proportional to the amount of stone distributed. This amount should be such that the raise leaves the rail about 2 in. below final elevation. This operation will usually leave the track out of alinement, but this condition can be easily corrected immediately behind the track raiser.

When this has been done, stone is again distributed in the track and smoothed with the track flanger, leaving enough for the remaining 2-in. raise and for filling the cribs to the standard ballast section. We leave the track in this condition (if in good surface) for about two months so it can settle under traffic. After that period of time has elapsed, the final raise is made and the track tamped with power tampers.

The track raiser can also be used in an analogous way for raising track in gravel ballast. In fact, we have used it for this purpose on a double track-line, where it is impossible to use the V-shaped, dig-out plow. In this case, instead of wasting the crib ballast, the track is lifted with the track raiser about 3½ in. or enough to place all gravel under the ties. New ballast is then distributed and the operation repeated as before explained.

Method Is Economical

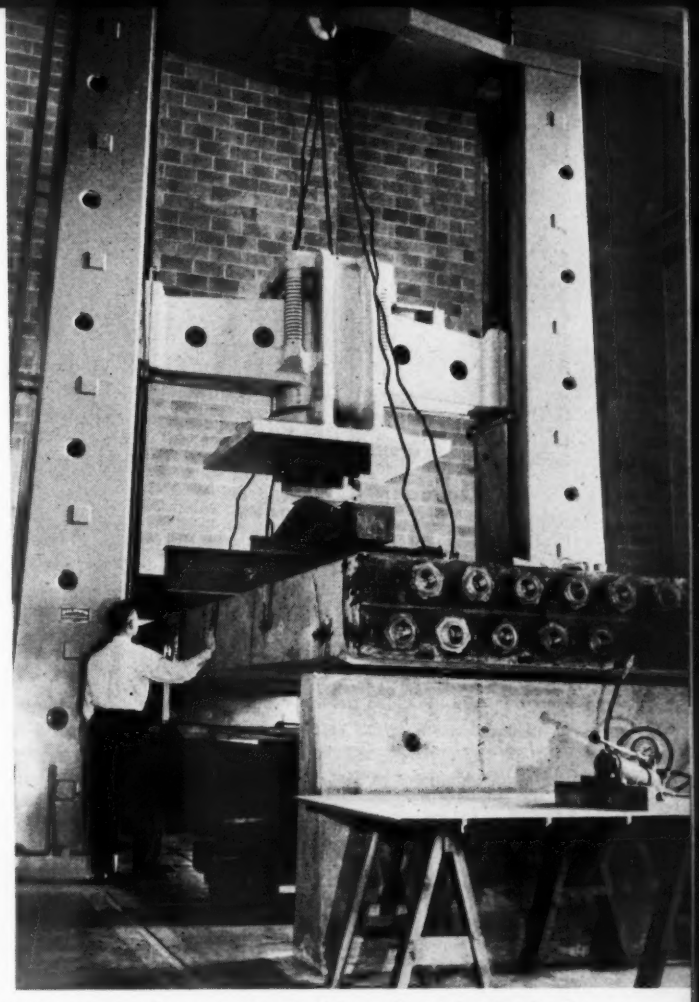
The work force required to reballast track with these two devices is only 8 men. Because the force is small and the work progresses rapidly, the cost of reballasting a section of 3.5 miles, including the dumping of the stone, amounts to only 55 to 60 per cent of the cost of the old method. The speed of the operation is fixed by the rate at which the new stone can be distributed. On our railroad five work-train loads of ballast, each containing 500 tons, are distributed in a week. Since 0.8 miles to 1.6 miles of track can be lifted by the track raiser in one or two hours, it has generally been used only once a week. During the rest of the time the gang is engaged in tie-tamping work.



***PULLMAN DELIVERS FIRST DOZERS**—Shown above being shipped from the Hammond (Ind.) plant of the Pullman-Standard Car Manufacturing Company is an International TD 24 tractor equipped with the first hydraulic dozer built by Pullman-Standard since it acquired the Road Equipment Division of the Isaacson Iron Works. The tractors are shipped to Hammond from the nearby International Harvester plant at Melrose Park, Ill. At Hammond, Pullman-Standard attaches the road equipment and ships to customers complete units.*

Builds and Tests Prestressed-Concrete Trestle Slab

Laboratory test is made by Portland Cement Association to determine practicability of prestressed concrete for use in construction of railroad trestle slabs. Findings are reported that show a reduction in dead load, savings in concrete and steel, a greater span-to-depth ratio, and less deflection than other types of construction.



The prestressed-concrete trestle slab ready for loading in the Portland Cement Association's million-pound testing machine

• Last fall the Portland Cement Association designed and constructed in its new laboratories at Skokie, Ill., something different in concrete railroad trestle slabs—a slab with a depth only about half that of a conventionl reinforced-concrete slab of the same span length, or about the same as that of a rolled-beam span of the same length. Yet, in spite of its shallowness, the slab, in a subsequent test, proved capable of supporting safely modern railroad loading. What made this slab different is the fact that it was made of prestressed concrete, i. e., concrete that was permanently compressed, after it had hardened, by tensioning high-tensile steel strands encased in the slab.

The test, the first one to be made of a prestressed-concrete trestle slab in this country, was witnessed by an interested group of railroad and highway engineers, including members of the A.R.E.A. Committee on Masonry and the American Railway Bridge and Building Association, and representatives of the highway departments of several states and the Bureau of Public Roads. In the test the slab, which was 25 ft. long, 7 ft. wide, and 18 in. deep, was loaded to failure in the Association's million-pound testing machine, while strains in the steel and the concrete as well as slab deflections were measured and recorded for all conditions of loading.

Results of Test

According to the Association the results of the test have proved that prestressed-concrete is entirely practical for railroad trestle slabs. Hence, it becomes possible to capitalize on the advantages of this type of construction as compared to other types. For example, dead load can be reduced, savings in concrete and steel can be realized, and clearances can be increased —all because of the shallower depths that are possible with prestressed concrete slabs. Furthermore, because span lengths can be increased safely, the number of bents required for a bridge can be reduced. Finally, the economic advantages of precasting can be realized, for prestressed concrete lends itself well to that method of fabrication.

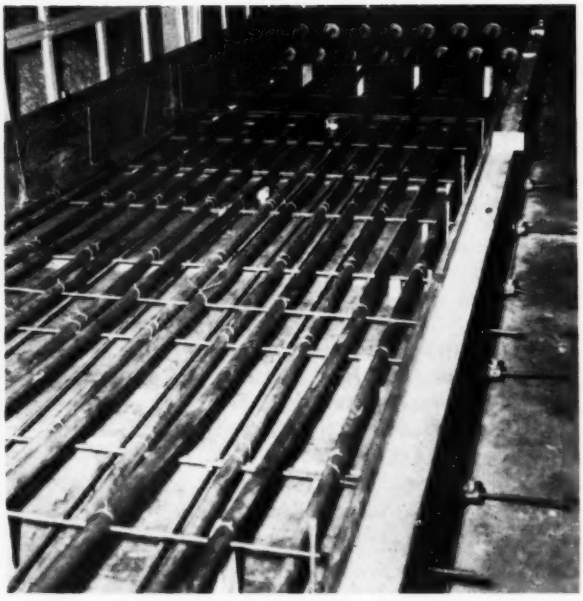
Design Considerations

The test slab was designed in accordance with A.R.E.A. specifications insofar as possible. Design requirements not covered by those specifications were based on current design procedures in use for prestressed concrete. The design load included dead load, live load (Coppers E72), and impact. For design purposes the slab was assumed to be supported on two pile bents, each containing three 24-in. concrete piles. The span length of 25 ft. was obtained by equating the capacity of the bents to that of the span.

The prestressing steel consisted of fifteen 1⅜-in. diameter high-tensile galvanized steel bridge strands, each strand containing 37 wires with diameters of 5 mm. (0.2 in.). The total cross-sectional area of the wires in each strand was 1.12 sq. in.

These strands were placed longitudinally in the form in two layers, eight in the bottom layer and seven in the top. The strands in the bottom layer were straight, but those in the top layer were curved so that their ends were 8 in. higher than their mid-points. The reason for curving the strands were to make the compressive stresses in the concrete practically uniform at the slab ends, to help reduce diagonal tensile stresses, and to reduce shearing stresses.

Sides and bottom of the slab form were of plywood. Ends were steel plates with holes at locations of prestressing strands



Prestressing strands in place. Note that the strands in bottom layer were straight while those in top layer were curved

In addition to the prestressing strands, ordinary reinforcing bars were placed longitudinally in the bottom of the slab to maintain a fairly uniform spacing of the cracks that would develop when the prestress force was overcome. Reinforcing bars were also placed transversely in the slab to carry the lateral stresses produced when the slab was prestressed.

How Concrete was Prestressed

As already mentioned the concrete was prestressed by post-tensioning the strands, i. e., by stretching the strands after the concrete had reached a strength of 5,000 psi. The strands were covered with thin plastic tubes to prevent them from bonding to the concrete, and were equipped at each end with threaded sockets which served as gripping devices and anchors. After being tightened, the strands were held in tension by nuts bearing against steel plates which also served as the ends of the form. The initial tension applied to each strand was 120,000 psi, which allowed for a loss in tension due to creep and shrinkage in the steel and concrete of 12 ½ per cent, or 15,000 psi.

Each of the sockets at the ends of the prestressing strands were 11 11/16 in. long and consisted of a tapered barrel with three equidistantly-spaced collars which acted as stiffeners. The outside end of each barrel was threaded both internally and externally. The steel bearing plates at the ends of the form were each made of two ¾-in. by 9-in. by 7-ft. plates welded together to form a single plate 18 in. deep. The top plate was canted slightly to make it normal to the curved prestressing strands. Holes 4 13/16 in. in diameter were burned in the plates at the locations of the prestressing strands, and pipe sleeves 5 in. in diameter were welded to the inside face of the plates over the holes.

Construction Details

The construction procedure for the test slab was simple and, except for use of the prestressing strands and the steel end plates, differed very little from the methods used in building a conventional reinforced-concrete slab. First the sides and bottom of the form, which were made of plywood, were erected on the laboratory floor and given two coats of form oil. Then the bottom layer of reinforcing bars was placed, next the prestressing strands, and finally the top layer of reinforcing bars.

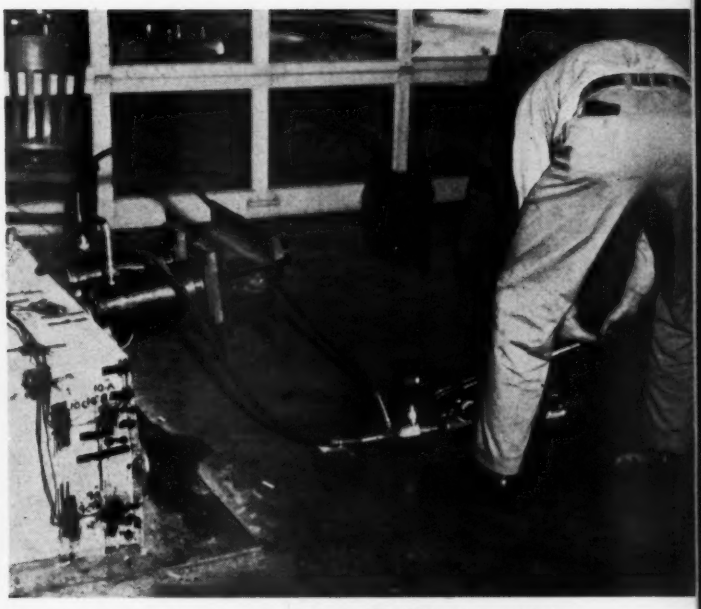
The strands with sockets attached were set by three men with the aid of an overhead crane. One man operated the crane while the other two, as a strand was lowered into the form, inserted the sockets into the proper pipe sleeves on the end plates. The sockets were pushed into the sleeves until their threaded ends projected about ½ in. outside the plates. Nuts were then screwed on the sockets two or three turns to hold the strands in position while the concrete was placed. The bottom strands were held in line by wiring them to the bottom mat of reinforcing bars, while the curved strands were held in position by wiring them to spacer rods set in the form. The minimum clear distance between strands was 4 ½ in. which left ample space for placing the concrete.

Placing the Concrete

The concrete was mixed in proportions designed to produce a compressive strength of 5,000 psi. in seven days. It was deposited in the form from a bottom dump bucket handled by the overhead crane. Compaction was accomplished by a spud-type internal vibrator. Excess concrete was screeded off and the surface of the slab was finished with a wood float. The slab was cured by covering it with burlap which was kept wet by sprinkling. After five days cylinder tests indicated that the desired strength of 5,000 psi. had been attained, so the curing was stopped and the prestressing operations were started.

The prestressing strands were tensioned by a 50-ton hydraulic jack consisting of a small hand-operated pump and two rams. In this operation the force of the rams was transferred to the prestressing strands

Before prestressing operations were started, concrete was cured until a compressive strength of 5,000 psi. had been attained



Prestressing strands were tensioned to 120,000 psi. by this hydraulic-jack set up. Strands were then held in tension by nuts

through a jacking frame and a jacking rod as shown in one of the accompanying illustrations. The strands were tensioned in a pattern which maintained as near a uniform pressure over the entire slab as possible. The stress in each strand was measured by a strain gage attached to the jacking rod and was checked roughly by the pump pressure. After all of the strands had been tensioned to the desired 120,000 psi., the slab was lifted into position under the test machine. During the test, the slab was supported on concrete abutments.

Strain-Gage Readings Taken

For each load increment applied to the slab, the strains in the concrete and the steel were read, at a central control panel, from a total of 92 gages which had been placed on the slab and the reinforcing steel during the construction. The deflections of the slab under each loading condition were measured at 11 different locations with a level and rod.

The applied load on the slab at the time of failure was 480,000 lb., or 2.5 times the total design load, which consisted of dead load, live load and impact. The cause of the failure was compression at the top of the slab. At ultimate load the stress in the steel was still far below the nominal yield point. In this respect the slab differed from most prestressed-concrete designs in which the steel yields first and the concrete fails afterward. The reason the concrete failed first in this instance is that the reinforcement provided for design load was such that the slab acted as an over-reinforced member as the load approached the ultimate. This is characteristic of a solid rectangular section.

Loss in Prestress

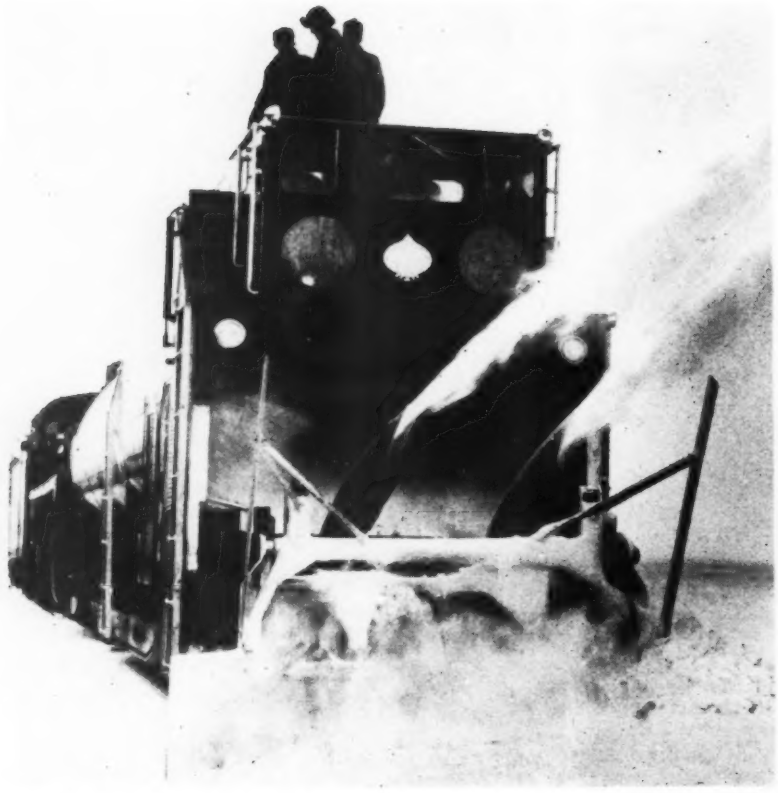
The measured loss in prestress due to creep and shrinkage at the time of final loading was 12,000 psi., compared with 15,000 psi. as assumed in the design. Some additional loss in prestress would occur with time, but it is believed that the 12,000 psi. represents

Under an applied load equivalent to 2.5 times the total design load, the test slab failed because of compression at the top

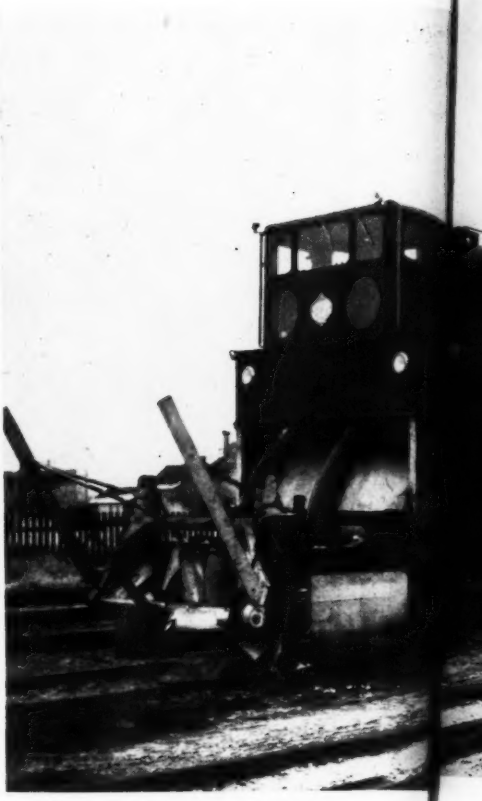
the major part of the total loss. The longitudinal bottom reinforcement which was used to distribute cracks in the slab after the prestress force was neutralized performed its function as anticipated. The bars were stressed to 25,000 psi. at the load which caused cracking in the concrete.

The deflections of the slab under dead load and prestress alone was 0.31 in. upward. At full design load the measured deflection was 0.03 in. downward. The deflection at the ultimate load of 480,000 lb. was more than 1.9 in.

The Association reports that stress computations based on the strains measured during the test compare very well with the design computations, and illustrate the dependability with which design computations can be made.



The combination rotary snow plow and melter in action on the Canadian Pacific



In this view the casting chutes are . . .

Snow-Fighting Unit

Newly-developed machine underwent severe service tests in Canada last winter. Snow picked up by rotors may be cast in any direction or into a melting tank where the finely-broken particles are saturated with hot water sprayed from nozzles.

• A new approach to the problem of fighting snow, especially around yards and terminals, is embodied in a recently-developed unit which can be operated either as a rotary snow plow or as a melter. Designed and built by the Wm. Bros Broiler & Manufacturing Co., Minneapolis, Minn., one of the new units was in operation during the past winter on the Canadian Pacific. From the experience gained with this unit a number of minor mechanical adjustments have been made in the machine.

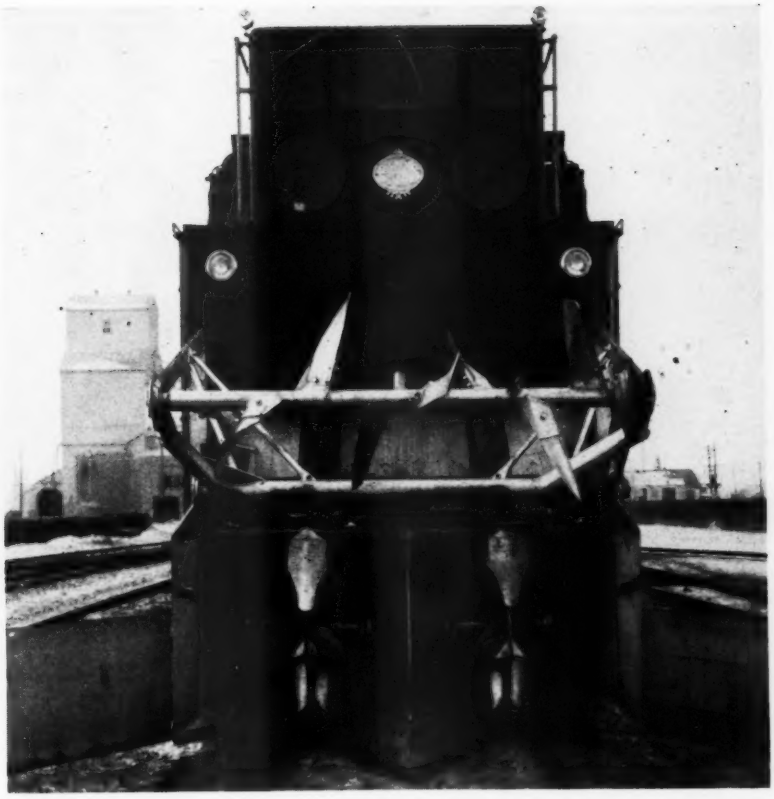
The combined rotary snow plow and melter consists essentially of a large steel tank mounted on a flat car which also incorporates, at the forward end, rotary rakes, rotors and chutes for picking up and discharging snow and ice in any direction or into the snow-melting tank. Also mounted at the forward end of the car over the rotary power unit and pump mechanism is the operator's cab. When in operation the unit is pushed by a steam locomotive, which also furnishes steam for heating the water that is used to melt snow.

Plow Is Standard Unit

The rotary snow plow at the forward end of the machine is similar in design to the Bros Sno-Flyr plow that is used widely on highway equipment. An essential part of this portion of the equipment is a heavy-duty rotating feeder rake which is mounted on a horizontal shaft so that it may be raised and lowered through an arc starting within 3 in. of the rail and reaching to a height of 8 ft. Behind the rake is a double-V moldboard with a V over each rail. In each V, and mounted also on a horizontal shaft, is a 42-in. rotor wheel for gathering and discharging the snow that is broken up and thrown back into the V's by the rake. Two adjustable discharge or casting chutes are provided, one over each rotor wheel. These are of the revolving type to permit the snow to be cast in any direction or into the melting tank.

The plow is powered by a heavy-duty 300-hp. engine through a heavy-duty gear transmission located in the plow moldboard. Power is transferred from the rotor drive shafts to the rake through a chain-drive power transfer assembly between the rotor drive shaft and the rake shaft. To minimize strain the rake shaft is mounted on sealed self-lining ball bearings at each end.

. . . adjusted to cast the snow into melter



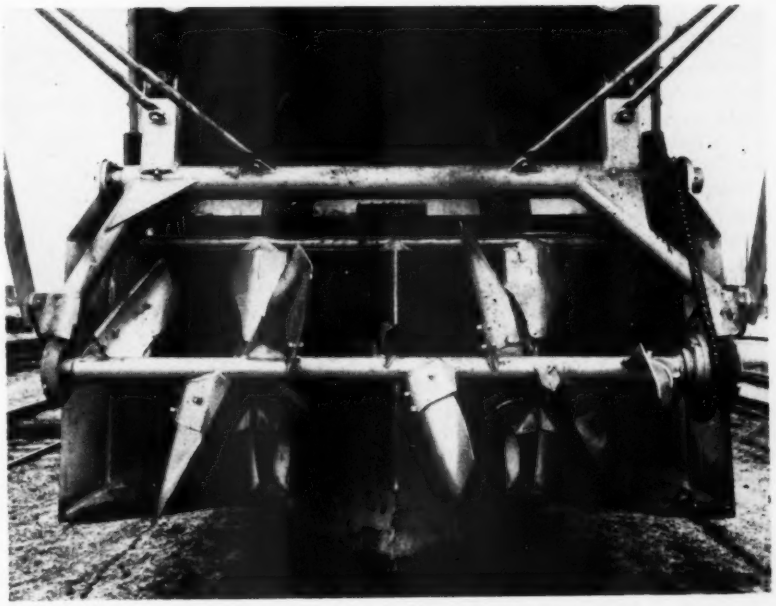
The plow with gathering wings extended and the feeder rake in a raised position

Combines Rotary Plow and Melter

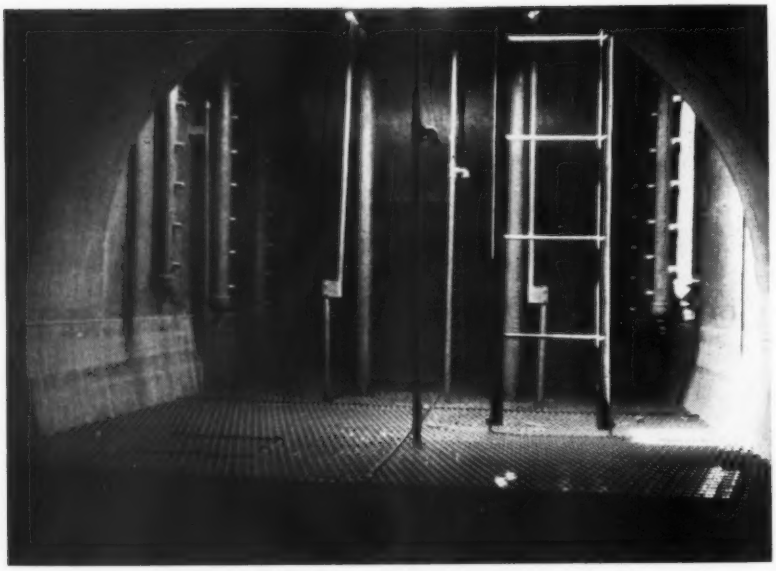
Gathering wings are provided to allow a coverage of 14 ft. when they are in the extended position; when adjusted inward the wings span a width of 11 ft. or they can be folded back behind the moldboard width of 9 ft. Directly behind the forward truck of the flat car is a scarifier which plows and loosens packed snow and ice to a depth of 3 in. below the tops of the rails. This mechanism is designed for quick lift, with automatic safety release, when frogs and similar obstructions are encountered.

How Snow Is Melted

Mounted along the side walls of the melting tank interior at the forward end of the unit is a series of nozzles from which a "cloudburst" of hot water is discharged in the form of pressure sprays when the unit is engaged in snow-melt-



Here the wings are folded back behind moldboard and rake is in lowered position



From a series of nozzles in melting tank hot water is sprayed over incoming snow

ing work. As the snow comes through the chutes under high velocity from the rotors it is in a pulverized condition so that the particles, when contacted by the hot water spray, quickly become saturated.

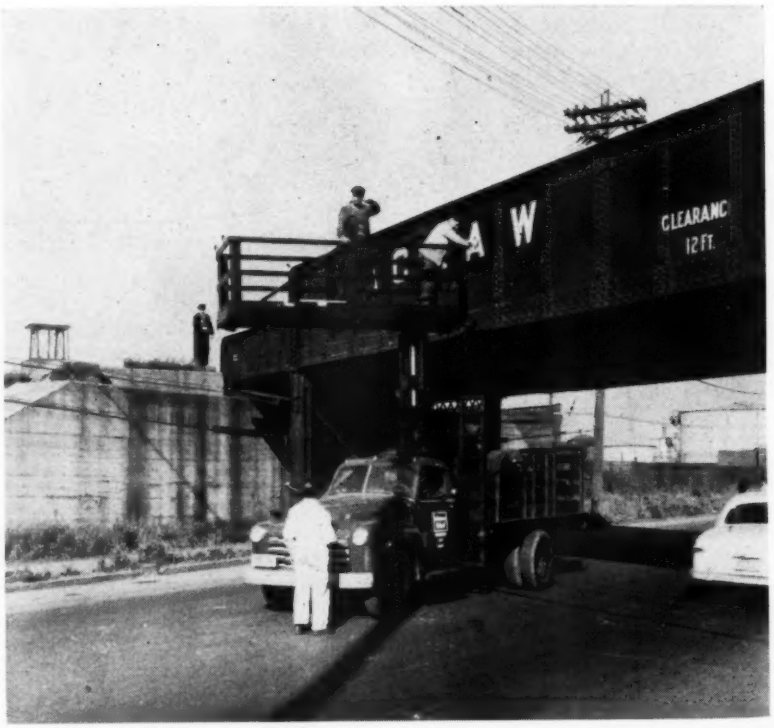
When starting to melt snow about 3,500 gal. of hot water must be available in the unit. This water is confined in front of a low baffle placed at the rear end of the spray chamber of the melting tank. Over the section of the tank containing the initial water supply is a covering of steel grating which prevents large foreign objects from getting into the circulating water supply. Steam from the locomotive is used to heat the circulating water supply by means of Schulte-Korting heaters. This water is circulated and discharged through the nozzles by means of a pump having a capacity of 125,000 gal. per hr., which is driven by the same engine that operates the rake and rotors. Suction of the water is taken over the full length of the supply section by means of suction pipes of a unique design.

The melting tank has a capacity of 19,000 gal. When this amount of water has accumulated from melting snow the unit is moved to a bridge or other suitable location and the water discharged through outlets in the lower sides of the tank . There are four such outlets, two on each side, which are 16 in. in diameter. For controlling the discharge of water, the outlets are equipped with shear gates which are operated manually by levers mounted on top of the tank. It is reported that the tank can be emptied in less than a minute. High efficiency is claimed for the entire unit due to the method of "spray" melting that is used.

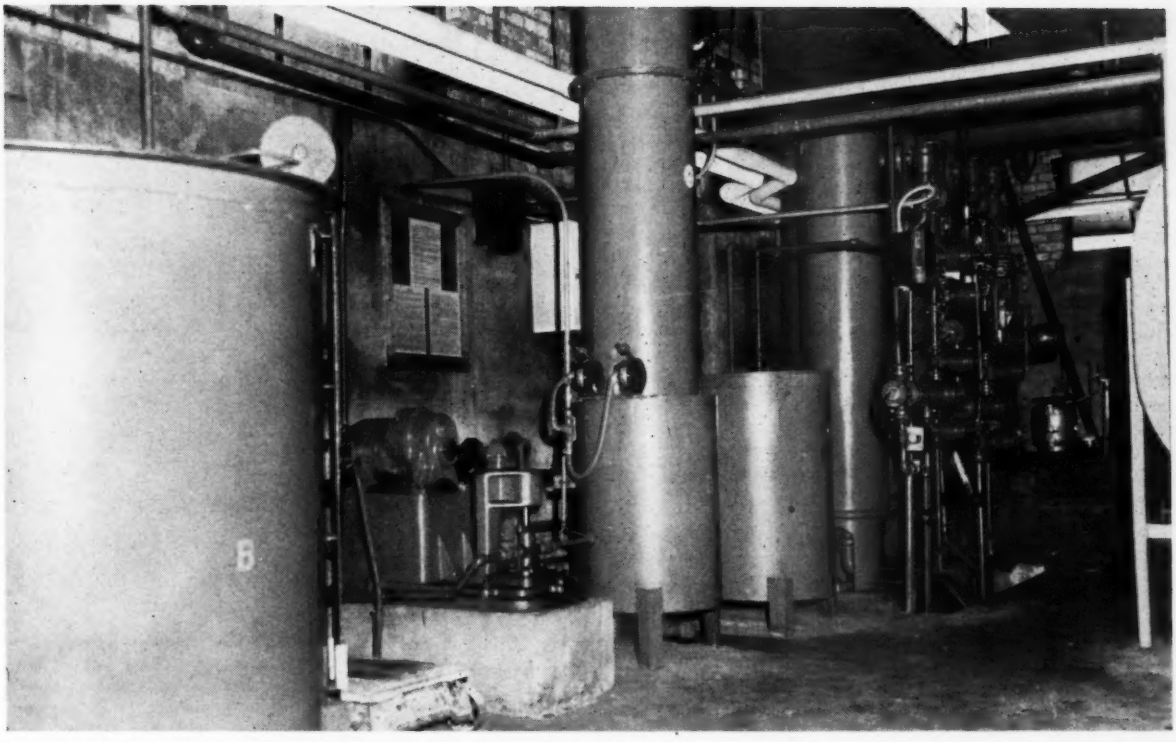
The operator's cab is functionally designed to permit complete visibility. It is insulated and equipped with sufficient heating equipment for adverse weather conditions normally encountered when fighting snow. The front windows of the cab are equipped with defrosters and wipers.

Cab Controls

Cab controls are provided for raising and lowering the rotary plow, for raising and lowering the rotary rake, for adjusting the revolving casting chutes, for positioning the gathering wings, and for controlling the scarifier. All such movements are actuated hydraulically. Gauges in the cab show the level of the water in the residual compartment and in the storage end of the tank as a whole, the steam pressure at the water heating units, and the pressure of the water in the circulating spray system. Also in the cab are valves for controlling the supply of steam, and a tachometer indicating the speed of the engine. Intercommunication between the pusher locomotive and the control cab on the melter tank is provided by a two-way loudspeaker system.



For painting or otherwise repairing bridges over highways, the Delaware, Lackawanna & Western uses highway trucks equipped with elevating platforms, as shown here



View of the Milwaukee's fully-automatic de-ionizing plant, located in the basement of new diesel shop at Bensenville, Ill., showing, from left to right, the tank holding a rust-inhibiting solution, a pump for transferring treated water to storage tanks, the decarbonater tank, the small tank for the soda-ash regenerant solution, and the anion exchange-adsorber tank

De-Ionizing Plant Made Fully Automatic

Electrical and pneumatic controls make the Milwaukee's de-ionizing plant at Bensenville, Ill., able to function continuously over week ends and holidays without attention. When the water purity falls below a pre-set standard, the plant regenerates its ion-exchange resins to restore their efficiency

• Unlike the "gremlins" of World War II who caused our airmen no end of trouble with their incomprehensible antics, the mysterious "little men" of the de-ionizing plant of the Chicago, Milwaukee, St. Paul & Pacific at Bensenville, Ill., are electrical and pneumatic controls which carefully measure the purity of the water produced and either accept it for use or reject it. If accepted, the water is passed on to two storage tanks and thence, by means of a pressure tank, pump and piping, to outlets located throughout the shop for use in the cooling systems of diesel locomotives. If rejected as not up to the required standard, the impure water is wasted and a cycle is begun which automatically regenerates the resins of the cation exchanger and the anion exchange-adsorber to restore their ion-exchange efficiency.

The new de-ionizing plant was installed in a basement room of a recently built diesel shop at Bensenville. Because the 40-hr. work week requires that the plant function without attention for two and sometimes three days over week ends or holiday periods, it was desirable that it be as fully automatic as possible. In addition, labor problems introduced by the 40-hr. work week would have necessitated the training of numerous plant operators had a manually actuated plant been installed. With the fully automatic unit, which was designed by the Dearborn Chemical Company, Chicago, it is possible to train and assign a single attendant for inspecting the plant at routine intervals and for supplying the required stock of regenerants.

Like Dearborn's standard manually-operated two-bed de-ionizing systems, the major components of the Bensenville plant are a cation exchanger, an anion exchange-adsorber, and a decarbonator. The new plant also includes smaller tanks for mixing the soda-ash regenerant solutions for the anion tank and the chromate solutions for treating the water after de-carbonization, as well as a Flowrator for proportioning the sulphuric-acid regenerant, a proportioning pump, and a Solu-Bridge for purity control.

In general, standard de-ionizing plants operate automatically once they are in service, since float switches

installed in storage tanks and magnetic valves incorporated in plant piping are used to start and stop the plants according to water demand. In addition, purity controls continuously monitor the quality of the de-ionized water produced by the plants and automatically shut them down in the event the water falls below a predetermined standard. However, most existing plants are classified as manual units because a plant operator is required to adjust valves, or to actuate regeneration cycles during the process of servicing the plant and restoring its capacity after exhaustion.

What makes the Bensenville plant different from others is that all operations are fully automatic, even including the regeneration cycles. This assures sufficient capacity to produce any quantity of de-ionized water required while the plant attendant is off duty. During normal operation, the plant attendant needs only to make an occasional inspection to see that the system is functioning according to the specified operating data, and to make sure that sufficient regenerants are on hand for two subsequent regenerations.

Regeneration Installed Two Ways

The Bensenville plant is designed to regenerate itself after a predetermined quantity of water has passed through the plant. In addition, since the railroad pumps water from four wells, each supplying water of different hardness, the plant purity controls can be adjusted to detect changes in water quality and to regenerate the plant automatically ahead of the usual schedule should the quality fall below standard. This is accomplished by timing devices and automatic valves to control the operation of the plant. The automatic valves include both air-operated diaphragm valves and electrically-actuated motorized valves.

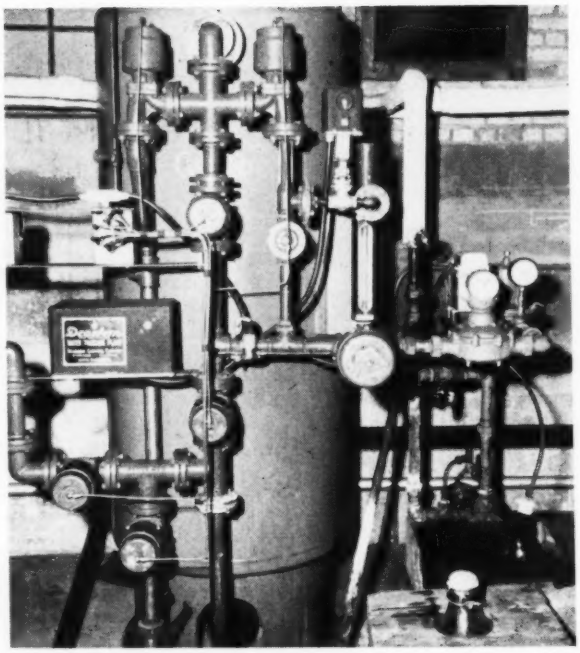
The regeneration cycle is initiated when the dial hand of a re-set mechanism on an inlet water meter reaches zero, and thereby actuates an electrical timing device. The electrical timer re-sets the meter dial to a new gallonage setting which represents the normal amount of de-ionized water produced by the plant for storage, plus the water required to regenerate the plant. The electrical timer also causes a motor-driven operation-selector, known as a "stager," to rotate first into the proper setting for positioning the air-operated valves that supply water to backwash the cation exchanger. At the proper time the timing device continues the regeneration cycle, and, by means of the stager, automatically positions valves in the designed sequence to complete the backwash operation, inject regenerant solution, rinse the exchanger bed, and return the cation exchanger to the service position.

At the end of the cation regeneration, this timer actuates a duplicate timing device on the anion exchanger which, in turn, places a second stager in operation to control, consecutively, the backwash of the anion exchanger tank, the injection of a soda-ash solution to regenerate the anion exchanger, and the rinsing operation. After the regeneration and rinse cycles have been completed, the timer and stager return the anion exchanger to the service position, allowing water to flow through the plant. The regenerative cycle for the cation tank takes about 1 hr. 16 min. and for the anion tank 1 hr. 11 min., totaling about 2 hr. 27 min. for complete regeneration of the plant.

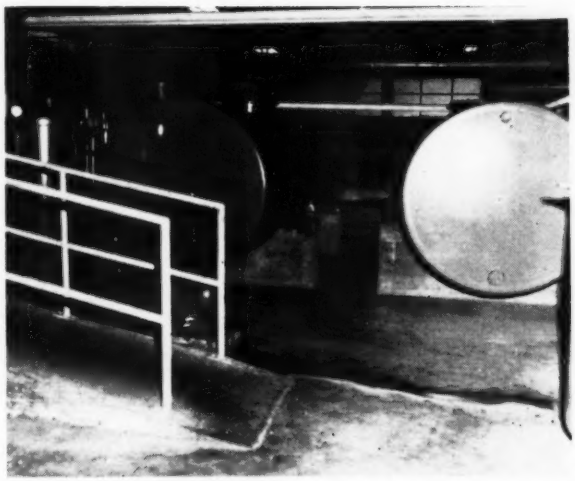
At this point, the Solu-Bridge purity controls test the water coming from the anion exchanger. If the anion mineral has not been sufficiently rinsed and the effluent has not reached the desired quality, the Solu-Bridge opens a dump valve causing the unsatisfactory water to flow to a drain. Once the de-ionized water reaches a quality acceptable by the Solu-Bridge, the dump valve closes and the decarbonator valve opens, allowing treated water to pass through the decarbonator and thence to the storage tanks.

If, at any time during the operation of the plant, the quality of the effluent water becomes unsatisfactory, the purity controls take over and open the dump valve until the water quality returns to the desired standard or until plant exchange capacity has been restored, through regeneration.

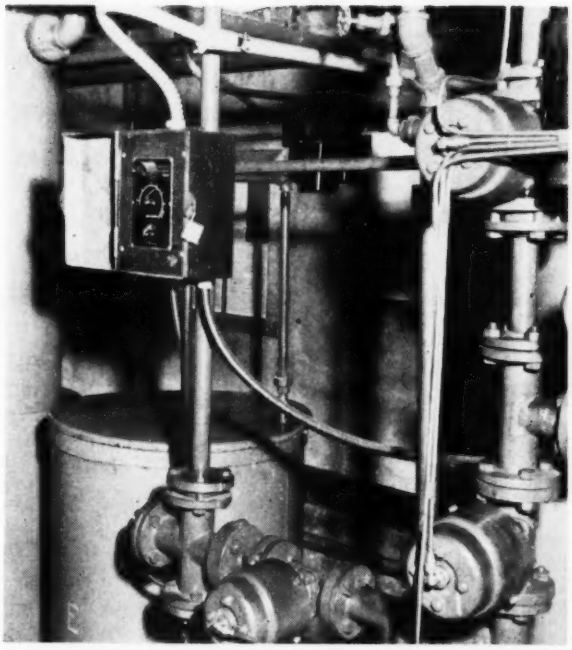
Regeneration at exhaustion may occur either when the predetermined quantity of water has passed through



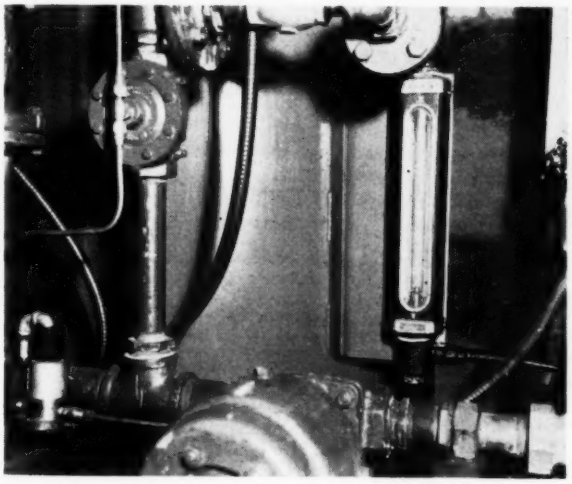
At the right is the inlet water meter which is equipped with the electrical re-set mechanism, while at the left is shown the box housing the electrical timing devices



From these two 2,500-gal. storage tanks the water is pumped by means of the pressure tank and centrifugal pressure pump at 50 to 70-lb. pressure to outlets in the diesel shop



The box with the opened cover houses the Solu-Bridge which determines the dissolved mineral content of the effluent from the anion tank and either accepts or rejects the water



The device with the appearance of a water gage is the Flowrator which proportions the sulphuric-acid solution for regenerating the cation exchange

the meter, or, near the end of a run, when the attendant notices discharge of water through the dump valve and manually advances the dial hand of the re-set mechanism to zero. The purity controls feature is particularly valuable when sharp changes in raw water quality occur, as when water pumping is changed from one well to another, or when the plant has been standing idle for a long period.

Raw-Water Quality Variable

A de-ionizing plant designed to operate and regenerate automatically by the water meter alone, i.e., with regeneration starting whenever a pre-set quantity of water has passed through the meter regardless of the quality of the water being produced, would not be satisfactory for Bensenville. The raw water quality is so variable from the four wells at this point that this type of control might allow thousands of gallons of poorly treated or untreated water to flow through the plant to storage in the event that the inlet water suddenly became much worse than the quality for which the plant was designed. Conversely, if the raw water quality suddenly improves, a meter-controlled plant might start the regeneration long before its exchange capacity had been exhausted, thus resulting in wasting of the regenerant materials and increased operating cost.

Irregularities Compensated

Hence, with the purity controls and the meter control, the Bensenville plant is so designed that it compensates for irregularities in inlet water quality, shutting down the plant when its ion-exchange capacity becomes exhausted, regardless of the amount of water that has passed through the plant, but allowing the system to operate so long as the water quality is satisfactory and thus utilizing the ion-exchange capacity of the resins to the maximum. The meter re-set mechanism is adjustable and can be varied to take advantage of favorable changes in the raw water quality.

The acid-feeding system of this plant eliminates any manual measuring, mixing or dilution of acid. It allows concentrated acid to be drawn directly from the carboy or storage tank during the regeneration cycle, with the necessary dilution being automatically accomplished in the acid-injection system. This system includes automatic regulating valves, flow-control devices, safety features, and a Flowrator which permits a visual check of the acid feed rate, if desired. With the exception of a Flowrator, similar automatic flow-regulating devices are included in the alkali regenerant system.

Controls Designed to "Fail Safe"

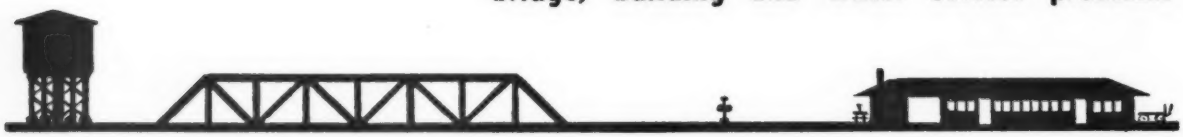
The controls of the automatic plant have been designed to "fail safe." In the event that any type of failure occurs, the plant will shut itself down and remain that way until the cause of the failure has been corrected. If the air pressure should fail, the air-operated main inlet valve automatically closes. If, on the other hand, the electric power supply should fail, then a solenoid air valve creates an artificial air pressure failure which closes the main inlet valve.

To prevent corrosion and the addition of any more minerals to the water being treated, all piping and valves between the inlet meter and the de-carbonator are Saran-lined steel. Also, the tanks for the cation exchanger and the anion exchanger each have a one-piece rubber lining.

In the performance of the plant so far, the regenerative cycle occurs about every five days. There is enough regenerant available for the plant to go through two regenerative cycles before a new carboy of acid has to be set in place and new soda-ash and inhibitor solutions must be mixed by the attendant. However, this reserve chemical storage capacity seldom nears depletion, because the attendant, who also operates a near-by lime-soda water-treating plant for steam locomotives, makes about five daily routine checks of the de-ionizing plant and keeps the regenerant materials at full measure.

WHAT'S THE ANSWER?

An open forum for maintenance men on track, bridge, building and water service problems



How to Raise Track on Stone Ballast

What is the best method of raising track about 4 in. on stone ballast, making tie renewals at the time the track is raised? Explain.

Suit Method to Old Ballast

By C. HALVERSON
General Roadmaster, Great Northern, Willmar, Minn.

The method to be used in raising track about four inches on stone ballast and making tie renewals at the same time depends on what disposition is to be made of the old ballast. Where the old ballast is dirty and the track has been churning, it would be desirable to remove all of the old ballast from the tie cribs. Cribbing machines can be used for this purpose. After this has been done, a bulldozer can be used to push the old material from the shoulder and strengthen the subgrade. (On some railroads, this work is being done advantageously with a motor grader—Editor)

In the process of cribbing the old ballast, it is desirable to space the ties, if necessary, to provide a uniform number to the track panel, and to make tie renewals in sufficient quantity to avoid disturbing the track to renew ties in the two or three years following the ballasting.

When this work has been completed, unload the stone ballast, using center-dump ballast cars, making two spreads of stone for a 4-in. lift and three spreads for a 6-in. lift. The method to be employed in making this lift depends on the kind of tamping equipment employed. Where a light mechanical tamper is used, jacks are placed under the rail about 8 or 10 on the side and are "tamped out" by the mechanical tamper. When a heavier mechanical tamper is used, smaller jacks are placed under the ends of the ties and spaced to provide a better bearing for the machine. This method will also permit the heavier machine to "tamp out" the jacks.

Where the condition of the old ballast justifies a preliminary raise to eliminate cribbing, then it is desirable to give the track a 2-in. lift, on which the ties can be renewed or spaced and the track tamped with a mechanical tamper. Then, before new stone ballast is unloaded, all of the remaining old ballast should be removed from the tie cribs and the ballast shoulder and "dozed" off to strengthen the subgrade. If curves are to be given a general realinement in connection with the ballasting, such work should be done on the preliminary lift so that little lining will be required after the track is raised on the stone ballast. This raising should always be done to grade stakes.

Careful Preparation Needed

By J. B. DAWSON
Senior Assistant Division Engineer, Southern Pacific, San Francisco, Cal.

Careful preparation pays just as large dividends on a ballast job as it does in any other maintenance operation. If the work is to be performed during very hot weather, joints should be oiled, expansion adjusted and rail anchors given necessary attention.

The first raise should be to an elevation satisfactory for tie renewals and yet low enough to per-

(Continued on page 642)

Answers to the following questions are solicited from readers. They should be addressed to the What's the Answer editor, *Railway Engineering and Maintenance*, 79 W. Monroe St., Chicago 3, and reach him at least 30 days in advance of the issue in which they are to appear. An honorarium will be given for each published answer on the basis of its substance and length. Answers will appear with or without the name and title of the author, as may be requested. The editor will also welcome any questions which you may wish to have discussed.

To Be Answered In the September Issue

1. Why, when and where should meetings of foremen be held? What considerations determine the best time and place for such meetings? If they are held during working hours, what provision should be made for supervision of the gangs?

2. What is the best way to overcome the destructive effect of soap, detergents or acids on the concrete aprons provided at car washers?

3. Should special types of tires be used on maintenance-of-way auto trucks which must be run on highways and also over rough terrain off the highways? Why? What types?

4. In painting open-deck steel bridges, should the ties be removed or shifted in order to clean and paint those portions of the stringers or girders which come into direct contact with the ties? Explain.

5. Should insulated joints be installed opposite each other or should they be staggered? Why? If staggered, what factors govern their spacing? What is the maximum and minimum spacing permissible? Why?

6. Where there has been a considerable reduction in the quantity of water required for steam locomotives because of dieselization, what changes or alterations can be made in water-treating plants or practices to minimize costs? Explain.

PENNY WISE . . . POUND FOOLISH

This Old Maxim Might Well Be Applied When Reduced Earnings Prompt Management Refusal of a Chemical Weed Control Program

FIVE years of chemical treatment on a western system produced a roadbed that was practically clear of vegetation. Earnings dropped. Reade Weed Killing Service was refused for three years. Weeds were out of control. Normal maintenance work was hampered. A Maintenance Engineer addressed a communication to his Chief, who held the purse strings:

> "When we discontinued Reade Weed Killing Service, in my opinion, we scrapped an investment of some one million dollars. It is now imperative that such service be restored."

It is not difficult for any Engineer to appreciate this viewpoint.

We invite an exchange of information on any Weed or Brush Control Program under consideration.

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mit a reasonable slow order. Following that operation a second raise should be made to put all old ballast under the ties to form subballast, leaving the track skeletonized.

To assure that the track is filled in each night, positive arrangements must be made for ballast to be distributed by local freight or by other means. The track is then raised on the new ballast and a suitable period of "wheel" tamping permitted after which the track is given a final lining and air tamping.

Group Men for Economy

By N. F. ALBERTS

General Foreman, Chicago, Milwaukee, St. Paul & Pacific, Chicago

This question brings to my mind the days when we were making out-of-face track raises of three to four inches on the old ballast without advance skeletonizing of the track and with the tie renewals handled during the raising operation. In such cases the height of the raise is limited to about four inches because there is only enough ballast in full tie cribs to permit a track to be raised about that much without unloading ballast ahead of the raise. Ballast distributed ahead for this purpose impedes the work of installing ties and is hence undesirable.

To facilitate this work new ties for renewals should be distributed along the track in advance of the raise, in accordance with marks previously placed on the rail over each tie to be taken out.

The gang organization should consist of a general foreman, 2 foremen, 3 assistant foremen, 1 machine operator and about 85 track laborers. The equipment, other than the ordinary track tools, consists of a power jack, an 8-tool tamping unit, and a ballast dressing machine.

This gang should be organized in five groups with a foreman or an assistant foreman in charge of each group. An assistant foreman should sight the spot board in doing the raising while one of the assistant foremen or a foreman should do the lining.

Before the work is begun, arrangements should be made with division transportation officers for the diversion of traffic, for speed restrictions over the track being worked, and for look-out orders.

The gang is organized as follows:

Group No. 1–
- 2 men, flagging
- 1 man, loosening bolts ahead of track raising
- 2 men, pulling spikes on ties to be renewed
- 1 man, attending spot board, using two boards
- 1 man, operating power jack
- 1 man, attending level board
- 4 men, tamping key ties

Group No. 2–
- 2 men cutting out cribs in front of ties to be removed
- 2 men, pulling out old ties
- 2 men, cleaning out beds for new ties
- 2 men, pulling in new ties
- 1 man, applying tie plates and spikes on new ties
- 6 men, with spike mauls, gage and claw bars, spiking new ties, correcting gage, and knocking down old spikes
- 2 men, spacing ties with tie spacers

Group No. 3–
- 3 men, raising low quarters with a small jack and shovels before track is full tamped
- 8 men, full-tamping track with power tampers
- 4 men, shoveling ballast for tampers
- 1 man, pushing power tamper car
- 1 man, picking small track scrap
- 1 man, retightening bolts
- 1 man, correcting rail anchors
- 1 man, handling tools
- 1 man, carrying water

Group No. 4–
- 10 men, lining track
- 4 men filling in open track

Finally, Group No. 5, with a foreman, an assistant foreman and 20 laborers unloads new ballast following the surfacing and lining operation; picks up low spots; and dresses the ballast to the standard section, using ballast-dressing machine to shape the shoulders.

How to Surface Welded Track Safely

What precautions should be taken to prevent continuous welded rail from "buckling" when it is being resurfaced or raised? Explain.

Precautions Are Necessary

By P. O. FERRIS

Assistant General Manager and Chief Engineer, Delaware & Hudson, Albany, N. Y.

On this property we have had considerable experience in the surfacing of welded track and we find that the following precautions should be taken before any work of this nature is done. First, the history of the laying of the rail must be checked to find the temperature at which the rail was laid. When that is known, a careful inspection of the track must be made to determine whether or not the closure joints are open or closed. If the rail has been laid at a medium temperature, say 60 deg. F. to 90 deg. F., the possibility that the rail will buckle when being raised is remote. In other words, if the rail is in tension rather than in compression, little trouble may be expected. The temperature at the time that the surfacing is to be done also must be considered. This means that the best time of day for such surfacing must be determined in advance.

If the closure joints are open when the work is to be carried out, no trouble may be expected. However, if the joints are tight, a better time should be chosen to surface the track. To prepare for this, the joints in the unwelded rail should be loosened, the rail allowed to expand and, if necessary, portions of rail should be removed to eliminate the possibility of buckling. A track supervisor can readily determine these facts before the work of surfacing is attempted.

No Trouble If Laid Right

By F. G. CAMPBELL

Chief Engineer, Elgin, Joliet & Eastern, Joliet, Ill.

Since we have not, as yet, been required to do any extensive surfacing of our continuous welded rail, I have had no personal experience upon which to base an answer to this question. It seems to me, however, that the "precautions" should be taken at the time the rail is laid rather than at the time it is to be surfaced. I am of

(Continued on page 644)

RAIL-TEL *In Action . . .*

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the opinion that, if continuous welded rail is extensively raised or otherwise disturbed at rail temperatures materially in excess of those at which the rail was originally anchored, buckling might very likely occur. This might be avoided by cutting out a piece of rail or by inserting an expansion point and then endeavoring to run out the expansion before the raise is made. However, I am inclined to doubt the practicality of this.

I believe that wherever possible it is the best practice to anchor continuous welded rail at temperatures somewhat above the average temperatures which will occur during the working season. To be specific, I think continuus welded rail should be anchored in this latitude at rail temperatures between 70 deg. F. and 90 deg. F. Personally, I prefer the high side. If this is done, I believe future surfacing work can be programmed so that it can be done at temperatures not in excess of and preferably lower than that at which the rail was originally anchored.

Should it be necessary to lay and anchor continuous welded rail at temperatures materially below the average, I think that a correction should be made at normal temperatures at the first opportunity. This might be done by removing short sections of rail and running the expansion out. If this is not done, it would seem to me that trouble could occur not only at the time of the first surfacing but at any time when extremely high summer temperatures are encountered.

What Is Life of Asbestos-Cement Siding?

On the basis of actual experience, what is considered the normal life of corrugated asbestos-cement roofing and siding when used on buildings at mechanical terminals? At other locations? What can be done to increase the life of such material?

Should Last 50 Years

By A. L. Becker
Engineer of Structures, Missouri Pacific, St. Louis, Mo.

In 1923 we applied corrugated asbestos-cement materials to several shop buildings at DeQuincy, La. All of that material is still in good condition and from all indications should be good for another 25 years, or perhaps longer.

We have also used this type of material for freighthouses and shop buildings at other locations. About 1925 or 1926 we installed this material on a shop building at St. Louis and painted it. The painting was not done with the idea of increasing the life of the material, but as a matter of color harmony with surrounding buildings. This material is still in excellent condition. We question whether painting or any other coating would appreciably increase the service life of this type of material, if at all.

We have found from our experience that when asbesto-cement materials are used for siding on buildings that might be struck by motor vehicles, hand trucks, etc., it is desirable to provide an 8-in. curtain wall of concrete or brick to a height of about 4 ft. above the foundation. Corrugated asbestos-cement siding is not easily shattered, but it can be broken by a sufficient number of severe impacts. However, in our opinon, if properly applied and maintained, this type of material should have a normal service life of 50 years without attempting to use any preservative treatment.

What Is Best Type of Cattle Pass?

What type of construction for under-track openings is best suited for cattle passes? Explain.

No Type Suits All Cases

By J. S. Hancock
Bridge Engineer, Detroit, Toledo & Ironton, Dearborn, Mich.

The cattle opening, lowly as it may be, is deserving of individual consideration and, like most other construction problems, there is no one type of structure that is best suited for all openings.

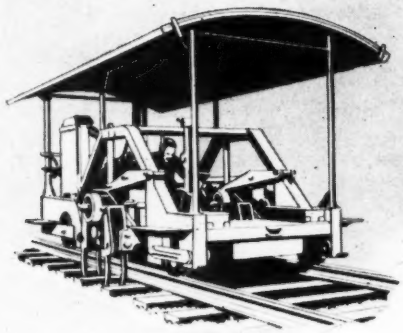
In tackling this problem the first thing to do is to check the records to see just what type and size of opening the deed requires for the cattle pass in question. As most railway properties were purchased before large-size circular or flat-base culverts were developed, the deed will usually require that a rectangular cattle pass be constructed with definite horizontal and vertical clearances. In building to conform with deed requirements, it is a case of selecting the best suited and most economical structure that will meet these requirements.

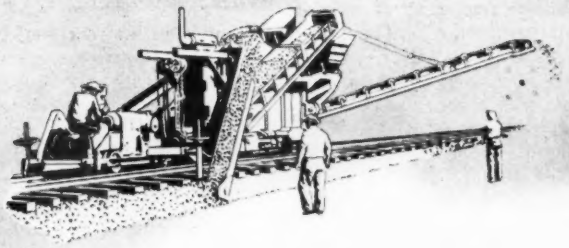
If it is thought that the existing deed requirements are excessive, it is good business to contact the interested land owner or owners to get permission to install a smaller and more economical type of cattle pass, as land owners and farm requirements are continuously subject to change, and it is entirely possible that they would be as nearly satisfied with a culvert type cattle pass as with a rectangular type. A cattle pass is often combined with a stream crossing. In that case consideration must be given to the stream requirements. In case it is thought practical to reduce the size of a combined cattle pass and stream opening, it is advisable to obtain the approval of the proper county authorities before any reduction in size is made. Such permission probably would not release the railroad from any legal responsibility in case the new opening proved to be smaller than the upstream land owners deemed necessary. However, the fact that an effort was made to install an opening satisfactory to the proper officials should have considerable bearing in a suit for damages to a stream opening that the land owners might claim to be too small.

When a rectangular opening of low height is required and the horizontal span can be met with timber construction, the single or triple-span open-deck or ballast-

(Continued on page 646)

Keep Ahead of Trackwork Schedules





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AVAILABILITY

Long-run payoff on your trackwork equipment is how great a percentage of working availability you get from each machine. With Matisa equipment, you have two important factors that produce maximum equipment availability to keep ahead of trackwork schedules:

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★ **IMMEDIATE ACTION ON PARTS AND SERVICES**

Matisa Automatic Tampers and Matisa Ballast Cleaners are without the "bugs" and "weak links" that frequently cause delays out of all proportion to their structural importance . . . And being structurally designed for continuous performance, both machines offer a degree of dependability we believe is unequalled in trackwork equipment now available.

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deck type of treated-pile trestle is still good construction. For economical construction of this type, all timber must be well penetrated with preservative and all timber should be framed before treatment. Piling cut-offs must be field treated with preservative and sealed absolutely tight against water. Two serious objections to this type of construction are that it requires frequent inspection and is subject to fire hazard.

In recent years the sectional steel plate and the circular and flat-base reinforced concrete pipe have been extensively used as cattle passes. They are particularly advantageous in high fills. They have the advantage of giving an unbroken roadbed and eliminate the fire hazard, both of which are particularly desirable on roads having passenger-train service.

To date we consider the sectional plate culvert and the circular and flat-base pipe on an equal basis. Most of our own cattle passes are combined with streams and the size of the opening is usually determined by the stream requirements. Sectional-plate culverts up to 11 ft. 3 in. in diameter have been in service for several years and to date are entirely satisfactory. They are readily assembled by company forces and it appears now that they will have a satisfactory life. Because of the experiences of others with ordinary underground steel pipe lines, it is recommended that all fill over metal culverts be made with clay, sand or other inactive material, free of corrosive substances. An ordinary brick bat in a backfill in contact with a buried steel fuel-oil line is known to set up some type of deteriorating reaction that will quickly eat a hole in the pipe. We could expect the same thing to happen at a slower rate to galvanized culvert pipe by similar material in the backfill coming in contact with the pipe.

When the size of opening is not controlled by stream or deed requirements, we use sectional plate or reinforced-concrete pipe, 8 ft. in diameter, or flat-base reinforced concrete pipe having approximately the same size. We would consider each equally desirable and would base our decision on which to use by selecting the one having the least cost erected in place.

In the case of soft foundation material there would be an advantage on the side of the sectional-plate culvert because of its lesser weight and the elimination of joints that, in concrete pipe, would tend to pull apart.

Reinforced-concrete pipe of large diameter requires the use of heavy equipment for erection. On the other hand when water has to be taken care of, we consider that such pipe has an advantage.

We consider it poor economy to use the minimum weight recommended for sectional plate as erection costs are practically the same for the different weights. The heavier weight has the advantage of additional safety and longer life at no additional cost except that of material. Pipe coating should add to the life of pipe. However, there should be no decrease in the amount of galvanizing even if the pipe is to be coated.

In the case of a combined cattle pass and stream opening we usually place the invert of the culvert approximately 18 in. below the existing stream bed to provide for future stream deepening.

Box and arch reinforced-concrete culverts as well as I-beam or concrete-slab spans on concrete abutments are entirely satisfactory for cattle passes. However, the cost and time required to construct them will usually be considerably in excess of that for sectional-plate or reinforced-concrete and flat-slab construction.

Fit Structure To Conditions

By W. C. HARMAN
Bridge and Building Supervisor, Southern Pacific, San Carlos, Cal.

Cattle passes may be of the undergrade or overgrade type depending on the nature of the terrain through which the railroad passes. In swampy territory it is sometimes necessary to go to the overgrade type, but undergrade passes predominate for reasons of economy.

Where undergrade openings are to be established for the sole purpose of passing livestock from one side of the right of way to the other, the location, as well as the type, should be considered.

In selecting the location, drainage should not be overlooked. Where possible a cattle pass should be on ground higher than the surroundings so that water will not stand in it causing a mudhole that makes inspection difficult and endangers the lives of smaller stock. For similar reasons it should be away from the natural water channels to preclude any possibility of floods trapping the animals.

A cattle pass should be located where the height of the fill minimizes construction cost, yet is deep enough for the structure. The opening should have sufficient vertical height (about six feet) to pass the largest stock and wide enough to permit stock to move without too much crowding. Six feet should be ample for this dimension.

Where a cattle opening is located in isolated territory, the structure should be fireproof, for fire in such a structure will not only be a hazard to traffic, but could also cause a loss of stock, particularly if they should become stampeded.

Should there be no alternative but to put the cattle pass in a high fill, a structure should be selected whose installation will cause the least disturbance to the fill and cost the least.

A metal or concrete pipe having an internal diameter of 72 in. appeals to me as being the ideal structure for the purpose but, where it is necessary to drive piles, a thin, ballast-deck structure, 8 ft. long, with a vertical clearance of not less than 6 ft. should be satisfactory.

May Need Floors

By GEORGE S. CRITES
Division Engineer (Retired), Baltimore & Ohio, Baltimore, Md.

Owing to changing conditions of land usage and occupancy, undertrack openings used as cattle passes may largely be considered as semi-permanent except where they also provide waterways.

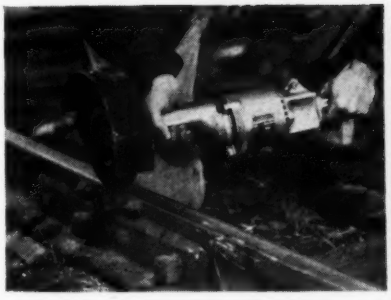
Where the opening serves both purposes, the installation should be given study based upon all known data and the design and construction should follow standards that fit all requirements for the particular location. The form it takes may be a bridge, an arch, or a large pipe or box culvert.

Usually, cattle passes may be classed as semi-permanent and a standard deck supported on treated pile bulkheads with properly designed wingwalls to fit ground requirements will economically fit places where cattle passes are called for.

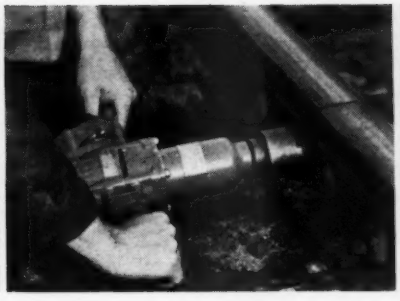
(Please turn to page 648)

It Started a New Phase in FASTER Bridge and Track Work

THE HOMELITE Dual Purpose GENERATOR



For operating high cycle grinders.



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When Should Switch Ties Be Renewed?

Does it make any difference whether switch ties are renewed at the beginning of the working season, when it is in full swing, or near its close? What factors are involved?

Depends on Renewal Method

By George S. Crites
Division Engineer (Retired), Baltimore & Ohio, Baltimore, Md.

It largely depends upon whether the out-of-face or spot methods of renewals are used in making switch tie replacements as to just when the renewals should be made. Usually the ties supporting the points and the frogs show signs of weakness first, although these are the ones that should be the firmest. Owing to the importance of such ties, they should always be given first attention.

Where switch ties deteriorate from decay rather than from mechanical wear, out-of-face renewals are usually called for. In such locations, which are not generally the most important, renewals can usually await a time when more urgent work is taken care of. This allows for more careful planning of material and labor.

Install Early in Spring

By H. S. Chandler
General Supervisor Track, Chesapeake & Ohio, Richmond, Va.

Our method of renewing switch ties is to replace only the rotten pieces, which run from one to several pieces per switch. In making renewals in that manner, switch ties should be shipped early in the spring and installed as quickly thereafter as possible, preferably in advance of routine surfacing programs. By doing this the handling of heavy treated switch ties in hot weather will be avoided, creosote burns on laborers will be reduced, and the switches will always be in sound condition whenever it is necessary to work through them when surfacing the main track. Switch ties should never be left on the ground very long, as the long lengths will warp badly.

It has always been my experience that we benefited by installing switch ties ahead of our regular spring surfacing program, as you can usually install switch ties before weather conditions are favorable enough to start raising track out of face.

How to Maintain Cathodic Systems

What maintenance procedures should be followed in keeping cathodic protection in steel water tanks at its highest effectiveness? Explain.

Must Inspect Annually

By I. E. Boberg
Chief Engineer, Chicago Bridge & Iron Co., Chicago

Cathodic systems have been installed in many of our tanks, sometimes as a part of our contract, but frequently as an independent arrangement between the tank owner and the company furnishing the cathodic equipment. Such participation on our part has been insufficient to give us any degree of expertness, but has lead us to make a few observations regarding the maintenance of cathodic systems.

First, it might be well to point out that, for a fee, the leading suppliers of cathodic systems in water tanks provide a maintenance service whereby they will perform annual inspections including recommended repairs. Where no regular maintenance staff is charged with the responsibility for keeping the equipment in effective operating condition, the utilization of the manufacturer's maintenance service is probably the safest course. Unless the unit is operating, the tank is not being protected.

In those cases where the tank owner performs his own maintenance, the first requisite is to familiarize himself with the particular unit installed. In the relatively short time that such systems have been used in water tanks, developments and improvements have followed rapidly. Today there is every reason to believe that installations performed by reliable suppliers have been properly engineered, taking into account the resistivity of the stored water as well as taking advantage of experience. Unfortunately, some of the original installations may not have been so well engineered, with the result that only an internal inspection of the tank will reveal how effective the protection has been.

To cite a few of the changes that affect maintenance, the first is the type of electrode. For the most part, the early installations used long-life electrodes of platinum, iron, etc. One of the principal disadvantages arose in the unheated tank in cold climates where ice was likely to form. The ice would tear the electrodes loose, with the result that protection stopped. The usual recommendation is to lift the electrodes clear of the water during the season when ice is likely to form. This is subject to the criticism that protection ceases as long as the electrodes are out of the water, but it is probably true that in most climates the period of dangerous ice formation is of comparatively short duration.

The danger of the permanent electrode arises primarily from false confidence because it is permanent. If it is disconnected and its ineffectiveness goes undetected, part or all of the system may be rendered inoperative. Thus it behooves the tank owner to inspect his electrodes each spring to see that they are intact.

Today a great many installations employ so-called "sacrificial" anodes of aluminum which go into solution with relative rapidity, requiring annual replacement. While we are not prepared to discuss the relative merits of the various types of electrodes, the sacrificial one has

(Continued on page 650)

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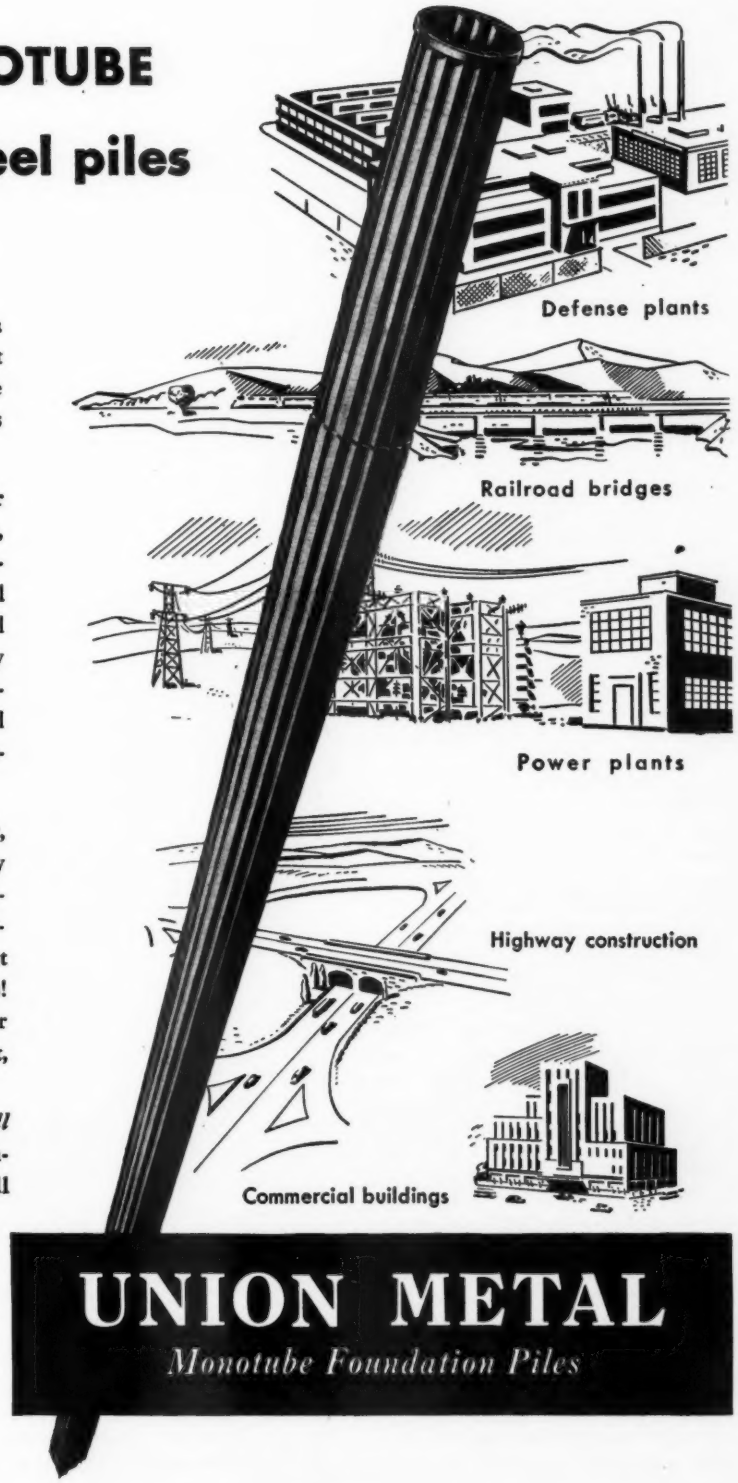
...with MONOTUBE taper-flute steel piles



THESE days, when conservation is a must, you'll want to take a *close* look at Monotube advantages and economies. We can't give you the whole story here, but as a starter, remember these facts . . .

CONSERVING MATERIALS! Due to their tapered design and cold-rolled properties, Monotubes *save steel* while providing unusually high bearing values and exceptional lateral stability. Result? Steel is conserved and required loads can often be carried by *fewer* Monotubes. Moreover, Monotube on-the-job extendibility, with easy cut-off and simplified weld-splicing, is another *big* factor in conserving materials.

SAVING TIME AND MONEY! Naturally, the above advantages save time and money as well as materials. But, *in addition,* Monotube taper-flute design results in *faster* driving. Lighter, standard driving equipment generally suffices even on the *tough* jobs! Then, too, because Monotubes are lighter in weight, they're easier, faster to transport, handle and locate.

Weigh these advantages. Then get *all* the facts and check them against your important construction projects ahead. You'll see many ways in which Monotube taper-flute steel piles offer material conservation as well as unusual economy all along the line. For complete data, write to The Union Metal Manufacturing Company, Canton 5, Ohio.

UNION METAL

Monotube Foundation Piles

the merit of making the annual spring inspection mandatory.

In some of the earlier installations, it was not considered necessary to install a separate anode to protect the interior of the large-diameter steel riser with which many elevated water tanks are equipped. Anodes were placed only in the tank proper on the theory that they would also protect the riser. It is now generally conceded that, to protect the riser, a center anode should be provided, extending down into the riser itself. If any owner has a tank without a center anode, he should check the riser carefully for corrosion and in all probability will be well advised to have one installed.

In recent years there has been a trend toward painting the interior of water tanks that are cathodically protected on the theory that the system would then have to protect only the holidays in the paint coat. The installed unit can therefore have a smaller capacity than if it had to protect the entire interior of the tank. If there is reliable information on the expected life of a paint coating under these conditions, we are unaware of it. As a result, it would behoove the tank owner periodically to inspect the paint coat carefully for disintegration and check thoroughly for corrosive attack at all holidays. Since such units are generally not designed to protect the entire surfaces, it follows that there is some point short of a complete paint failure where repainting will be necessary to maintain effective protection. In the unpainted, cathodically protected tank, it has always been considered desirable to maintain effective paint protection on the interior above the fluctuating water level.

All of the above has been in the nature of general comment to emphasize the important point that such installations should be inspected annually, both to check the unit and also to observe the tank interior for any signs indicating incomplete protection. Annual inspection (in the spring for cold climates) is the most important maintenance "must". In addition, it goes without saying that frequent exterior inspections to confirm continuity of current supply is most important.

With regard to any detailed maintenance that might be required in connection with the rectifier or other parts of the unit, we know absolutely nothing. If such maintenance is required, instructions should be requested of the manufacturer.

Inspection Plan Essential

By G. E. MARTIN
Superintendent Water Service, Illinois Central, Chicago

Cathodic protection units require a systematic inspection plan to maintain highest efficiency. This can best be attained by having a local representative make an inspection of facilities at given intervals, possibly 30 days, reporting to the officer responsible for proper operation. An inspection report on card form showing amperage desired and actually obtained, with space for remarks on adjustments made, is sufficient. In addition, there should be an inspection of the entire interior surface of the tank at three-year intervals by a qualified inspector to determine whether sufficient protection is being received. Certain conditions might require adjustment in anode spacing or an increase in amperage.

The actual maintenance required is largely the replacement of the sacrificial anodes. In climates where ice forms in tanks, the anodes usually will be torn out if left in place through the winter months. Anodes made of non-homogeneous alloy may have a short service life due to the concentration of loss of metal at one point.

It appears desirable to determine by trial the size and chemical composition of anodes necessary to give 12 months' protection, making the installation in the spring, expecting to replace the following spring. The aluminum-type rods are relatively easy to handle and may be secured in alloys which will give good service. The original installation should be made in such a manner that water service employees may make renewals without need for an electrician to be present.

***TRACTORS AID IN CLEARING UP WRECK**—Pressed into service from a nearby logging site, the two Caterpillar D8 tractors shown above gave valuable assistance in clearing up a recent wreck on the Southern Pacific near Merrill, Ore. The wreck, according to news reports, resulted from a "clear case of sabotage". The engine and 16 cars of a 79-car freight train derailed at a switch which had been tampered with. The tractors are owned by Hunter & Collman, logging contractors, Klamath Falls, Ore.*

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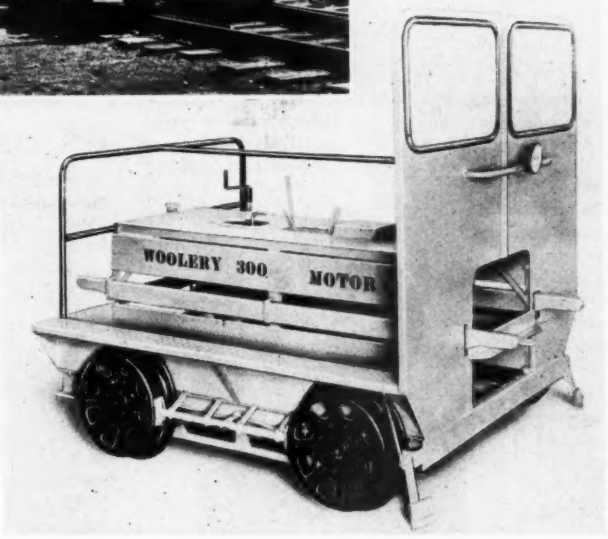

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THE MONTH'S NEWS

Happenings among the railways — the associations — the suppliers

Changes in Railway Personnel

General

K. J. Silvey, division engineer of the New York division of the Pennsylvania, has been promoted to assistant superintendent of the Eastern division at Toledo, Ohio, and **J. W. Wallenius,** division engineer on the Eastern division, has been promoted to assistant superintendent on the Chicago division. **W. J. Ott,** supervisor of track at Johnstown, Pa., has been appointed assistant trainmaster at Conway, Pa.

James P. Newell, general manager of the Western region of the Pennsylvania at Chicago, and an engineer by training and experience, has been advanced to assistant vice-president in charge of operation at Philadelphia, Pa. **J. A. Schwab,** assistant general manager of the Eastern region at Philadelphia, and also an engineer by training and experience, has been promoted to assistant vice-president, Eastern region, at New York.

Harold J. McKenzie, executive vice-president of the St. Louis Southwestern (Cotton Belt), and formerly chief engineer of the Southern Pacific Lines in Texas and Louisiana, has been promoted to president of the Cotton Belt, with headquarters as before in St. Louis, Mo.

A native of Houston, Tex., Mr. McKenzie was graduated from the Texas Agricultural and Mechanical College in 1927, and completed three years of post-graduate work at the Houston Engineering College. He entered railway service with the Southern Pacific Lines in 1926 while still in school. and held the positions of draftsman, chief draftsman, assistant to chief engineer, assistant chief engineer and chief engineer. He was appointed executive vice president of the Cotton Belt on January 1 this year.

Harold J. McKenzie

W. H. Hillis, operating vice-president of the Chicago, Rock Island & Pacific, and an engineer by training and experience, has been appointed senior vice-president, a new executive post. He is succeeded by **D. B. Jenks,** assistant operating vice-president and also an engineer by training and experience.

W. H. Hillis

Mr. Hillis started his railroad career in 1906 as a rodman on the Chicago, Burlington & Quincy, later serving as roadmaster, trainmaster, division engineer and construction superintendent on various divisions. He joined the Rock Island in 1936, as engineer maintenance of way, becoming operating officer in 1942. Mr. Hillis became vice-president in charge of operation in 1948, when the road emerged from trusteeship.

Mr. Jenks began his railroad career on the Pennsylvania in 1937, upon graduation from Yale university. Later he joined the Great Northern, serving successively as roadmaster, division engineer and trainmaster. Following military railway service as a lieutenant colonel during World War II, Mr. Jenks returned to the Great Northern as division superintendent. He became assistant operating vice-president of the Rock Island on December 15, 1950.

D. B. Jenks

Engineering

F. E. Mayne, supervisor of track on the Illinois Central, has been promoted to division engineer, with headquarters as before at Dubuque, Iowa.

G. R. Jenkins, district engineer on the Chesapeake & Ohio, with headquarters at Pikeville, Ky., has been transferred to Clifton Forge, Va., to succeed **E. G. Rice,** who has retired.

Robert B. Hand, civil engineer for the Alabama State Highway Department at Montgomery, Ala., has been appointed assistant engineer, engineering department, of the Central of Georgia at Savannah, Ga.

T. L. Pidcock, division engineer on the Union Pacific, at Cheyenne, Wyo., has been promoted to assistant to chief engineer, with headquarters at Omaha, Neb. He succeeds to the duties of **L. G. Shriver,** senior assistant to chief engineer, who has retired. Mr. Pidcock is succeeded as division engineer by **J. W. Godfrey,** acting division engineer at Salt Lake City, Utah. **C. E. McCauley,** office engineer under the chief engineer at Omaha, succeeds Mr. Godfrey.

Mr. Pidcock started with the U. P. in 1906 in the mechanical department of the Oregon Short Line (then a U. P. subsidiary) at Ogden, Utah, moved to Pocatello, Ida., in 1911, and, after service in World War I, became chief drafts-

T. L. Pidcock

man on the O.S.L. at Salt Lake City, Utah. He was appointed division engineer at that point in 1942, and was transferred to Cheyenne the same year.

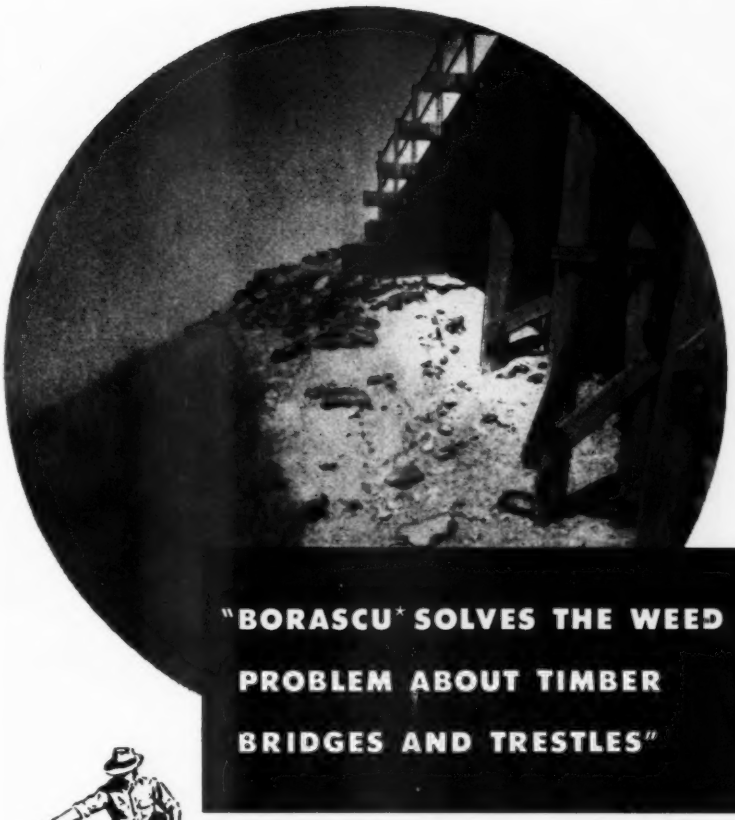
Mr. Shriver began his railway career with the Pennsylvania as an agent and telegraph operator. After serving on two other roads, he joined the U. P. in 1905 as chief clerk in the engineering department at Salt Lake City. In 1942

L. G. Shriver

he was sent to Omaha where he held the position of assistant to system maintenance engineer and assistant to chief engineer before his appointment as senior assistant to chief engineer in 1948.

W. N. Myers, assistant division engineer on the Pennsylvania, at Altoona, Pa., has been promoted to division engineer of the Pennsylvania-Reading Seashore Lines, succeeding **J. C. Warren,** who has been transferred to Columbus, Ohio, where he replaces **L. W. Green.** Mr. Green has been transferred to New York to replace **K. J. Silvey,** whose promotion to assistant superintendent is noted elsewhere in these pages. **J. M. Minturn,** supervisor of track at Philadelphia, Pa., has been promoted to assistant division engineer at Altoona to replace Mr. Myers. **C. H. Kooser,** assistant division engineer at Philadelphia, Pa., has been promoted to

(Continued on page 654)



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Railway Personnel (Cont'd)

division engineer at Buffalo, N. Y., succeeding **W. T. Hammond,** who has been transferred to the Eastern division at Pittsburgh, Pa. Mr. Hammond succeeds **J. W. Wallenius,** whose promotion to assistant superintendent is noted elsewhere in these columns. **E. E. Zacharias,** supervisor of track at Rochester, Pa., has been promoted to assistant division engineer at Philadelphia to replace Mr. Kooser. **Norman Olsen,** supervisor of track at Dennison, Ohio, has been promoted to assistant division engineer on the Eastern division at Pittsburgh, Pa., to replace **D. E. Callahan,** who has been appointed assistant engineer in the office of chief engineer maintenance of way at Pittsburgh.

R. C. Baker, who has been promoted to engineer of structures of the Chicago & Eastern Illinois at Danville, Ill., as announced in the June issue, entered the service of the C.&E.I. in December, 1925, and was employed as yard fireman and assistant on the engineering corps while taking a cooperative engineering course at Evansville college. He was transferred to the engineering department at Danville in 1928 as assistant on the engineering corps. Later he served as bridge inspector, supervisor of scales and assistant engineer. In September, 1941, he became supervisor of bridges and buildings, which position he held until his recent promotion.

R. C. Baker

John C. Jacobs, assistant engineer maintenance of way of the Illinois Central, has been promoted to engineer maintenance of way, with headquarters as before at Chicago. He succeeds **Charles M. Chumley,** who has retired after 48 years of continuous service with the I. C.

Mr. Jacobs was born at Amboy, Ill., in 1892. He attended the University of Illinois, and in 1912 joined the I. C. as a chairman on a surveying party in Alabama, subsequently serving as chainman and instrumentman on the Memphis, the St. Louis, the Chicago Terminal and the former Wisconsin divisions. In 1936 Mr. Jacobs was appointed acting super-

visor of track on the Springfield division, and in the following year, he became supervisor of trains and tracks on the Peoria district. During 1942 and 1943 he served as supervisor of track at East St. Louis, Ill. Mr. Jacobs was appoint-

John C. Jacobs

ed division engineer on the Mississippi division in June, 1943, acting assistant engineer maintenance of way, at Memphis, Tenn., in March, 1948, and assistant engineer maintenance of way there in September, 1948. He was transferred to Chicago in 1949.

Mr. Chumley joined the I. C. on March 16, 1903. He worked in the bridge department on the New Orleans division until May 1, 1906, when he was appointed bridge and building foreman. Mr. Chumley was promoted to supervisor of bridges and buildings on the Memphis division on December 1, 1909, and was made roadmaster on May 20, 1920. After serving in the latter capacity on the Mississippi, the Louisiana, and the Kentucky divisions, he was ad-

Charles M. Chumley

vanced to district engineer, Southern Lines, on June 10, 1937, and to engineer maintenance of way on June 1, 1941.

W. Lenco, whose appointment as bridge engineer of the Atlantic region of the Canadian National, with headquarters at Moncton, N. B., was an-

(Continued on page 656)

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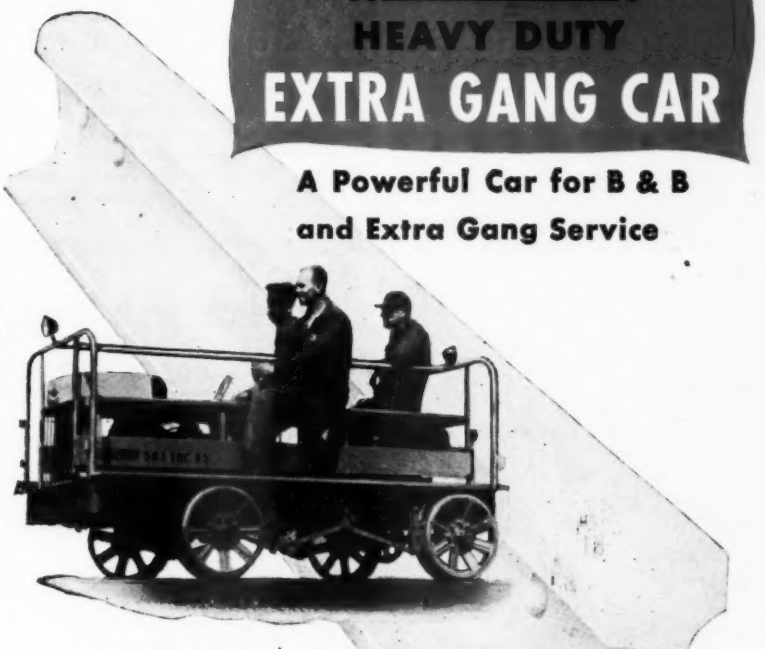

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Railway Personnel (Cont'd)

nounced in the May issue, is a native of Roumania, coming to Canada with his parents at an early age. He entered the service of the Canadian National as a clerk in the department of natural resources and development at Montreal. Que., in 1928, and in 1937 was appointed assistant engineer. In 1941 he went to Halifax, N. S., as an instrumentman on the construction of the lighterage facilities at that port, and in 1942 was advanced to engineer in charge. Mr. Lenco was made assistant engineer in the regional engineering department at Moncton in February, 1944, and was appointed terminal engineer in 1947. He became assistant bridge engineer at Moncton in 1950, and continued in that position until his recent promotion.

T. F. Burris, assistant chief engineer, Pere Marquette district, of the Chesapeake & Ohio, has been promoted to chief engineer, with headquarters as before at Detroit, Mich. He succeeds **H. J. Bogardus,** who, having requested relief from the full responsibilities of the engineering department because of the state of his health, has been appointed special engineer. The position of assistant chief engineer has been abolished. **D. C. Alexander** has been appointed assistant office engineer, with headquarters at Detroit.

Mr. Burris was born at Sault Ste. Marie, Mich., July 27, 1899, and was graduated from Michigan State college in 1924. He entered railroad service in October, 1928, with the Pere Marquette (now P. M. district, C. & O.), and after holding various positions he joined the Corp of Engineers, U.S. Army in 1925. When he returned to the P. M. in 1928, he was appointed instrumentman at Saginaw, Mich., and in 1929 became assistant engineer at Grand Rapids, Mich. Mr. Burris was advanced to division engineer in 1943, and to assistant chief engineer in 1951.

T. F. Burris

Track

H. S. Acomb, assistant roadmaster on the New York, Chicago & St. Louis at Norwalk, Ohio, recently retired after 24 years of service.

R. W. Young has been appointed track supervisor of the Third district of the New Mexico division of the Atchison, Topeka & Santa Fe.

J. H. Stevens has been appointed supervisor of track on the Illinois Central, with headquarters at Dubuque, Iowa, succeeding **F. E. Mayne,** whose promotion to division engineer is noted elsewhere in this issue.

Willie C. Houlditch, section foreman on the Southern at Jones, Ala., has been promoted to track supervisor at Selma, Ill., succeeding **David Wetterau,** who has been transferred to Danville, Va. **Allen P. Bowen,** extra gang foreman, has been advanced to track supervisor, with headquarters continuing at Birmingham, Ala. Mr. Houlditch was born at Randolph, Ala., on June 6, 1903, and entered the employ of the Southern as a section laborer on the Mobile division in February, 1917. Since then he has served as extra gang foreman, track welder helper and section foreman at various points on that division. He was appointed section foreman at Jones in February, 1941.

Mr. Bowen was born at Steward, Ala., on May 11, 1912. He began service with the Southern in September, 1926, as a laborer on the Birmingham division and, since 1937, has served as relief bolt-

ing machine helper and operator, relief track foreman and extra gang foreman on that division.

R. Y. Cooke, roadmaster on the Norfolk & Western at Iager, W. Va., has been transferred to Bluefield, W. Va., succeeding **V. W. Phillips,** whose death is noted elsewhere in these columns. Mr. Cooke is succeeded as roadmaster by **J. F. Anglin,** assistant roadmaster at Portsmouth, Ohio, who is in turn succeeded by **A. H. Steele, Jr.,** section foreman at Wheelersburg, Ohio. **B. H. Tinsley,** assistant roadmaster on the Radford division, has been promoted to roadmaster on the Shenandoah division, succeeding **G. B. Atkins,** who has retired. **J. M. Nimmo,** assistant roadmaster, Pulaski district, succeeds Mr. Tinsley and is in turn succeeded by **R. F. Dunlap,** assistant roadmaster on the Norfolk division. **O. H. Woolwine, Jr.,** inspector, office of manager roadway maintenance, has been appointed assistant roadmaster on the Norfolk division to succeed Mr. Dunlap, and **J. J. Kendrick, Jr.,** inspector, engineering department, replaces Mr Woolwine.

John T. Cooper, who has been appointed supervisor of track on the Pennsylvania at Dunkirk, N. Y., as announced in the May issue, was born at Westfield, N. J., on December 15, 1924, and graduated from the Massachusetts Institute of Technology in 1947 with the degree of Bachelor of Science in civil engineering. He entered the service of the Pennsylvania as a block operator on the New York division in June, 1942, and was appointed junior engineer at Fort Wayne, Ind., on October 15, 1947. Mr. Cooper was advanced to assistant supervisor of track at South Chicago, Ill., on August 15, 1948, and was transferred to West Philadelphia, Pa., on January 15, 1949, where he remained until his recent promotion.

Changes on the Pennsylvania

D. W. Gangluff, general foreman on the Chicago division of the Pennsylvania, has been promoted to assistant supervisor of track on the Columbus division, at Columbus, Ohio, succeeding **J. S. Fluke,** who has been transferred to the Pittsburgh division at Derry, Pa. Mr. Fluke succeeds **E. L. Clausing,** who has been promoted to supervisor of track at Logansport, Ind., to replace **J. M. Rankin,** who has been transferred to Buffalo, N. Y. Mr. Rankin succeeds **J. W. Diffenderfer, Jr.,** who has been transferred to Johnstown, Pa., to replace **W. J. Ott,** whose appointment as assistant trainmaster is announced elsewhere in these columns. **F. R. Matthews,** junior engineer on the Philadelphia division, has been promoted to assistant supervisor of track at York, Pa., succeeding **C. G. Knight,** who has been transferred to Cresson, Pa., where he replaces **W. P Super.** Mr. Super has been promoted to supervisor of track at Kalamazoo, Mich., succeeding **W. S. Titlow, Jr.,** who

(Continued on page 658)

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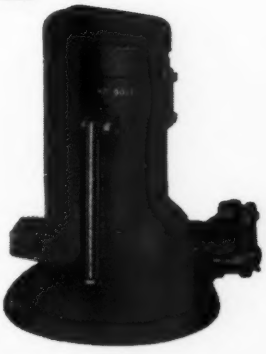

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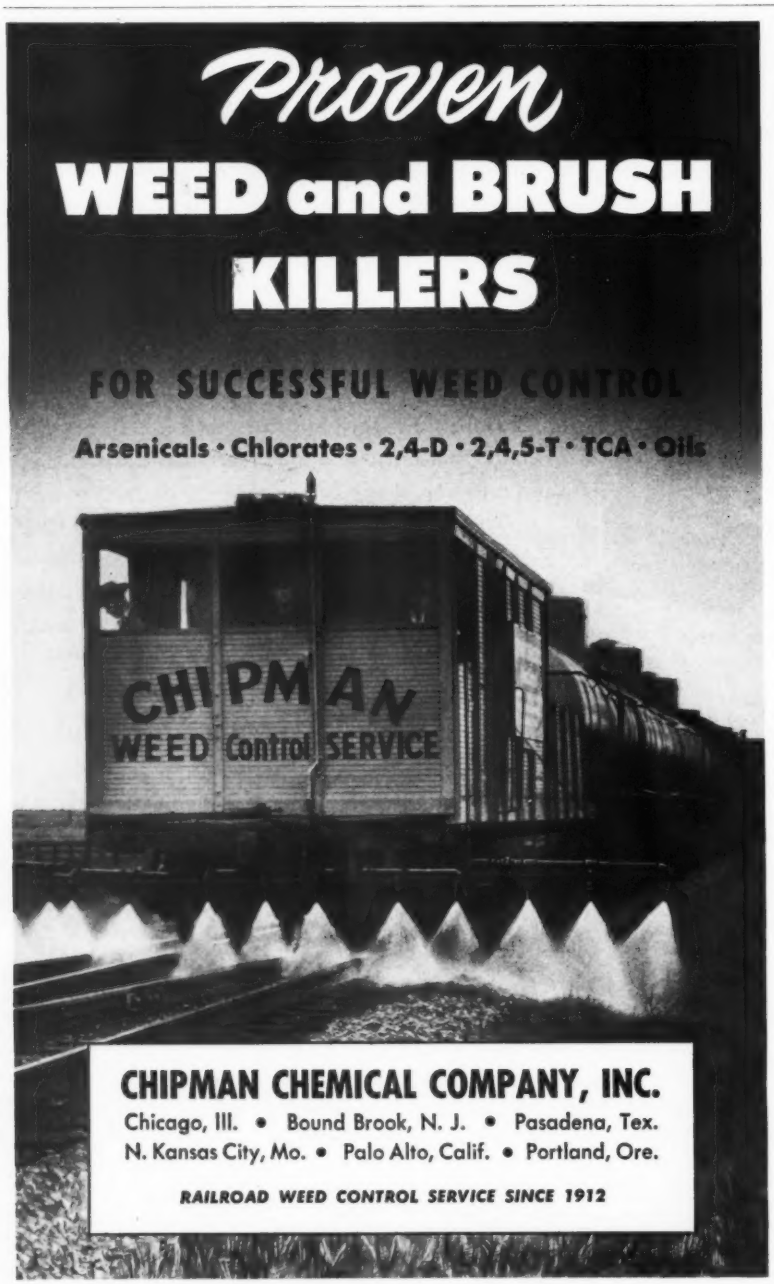
Railway Personnel (Cont'd)

has been transferred to Trenton, N. J., to replace **P. A. Mainquist,** who has been appointed supervisor of track, office of comptroller. Mr. Mainquist succeeds **L. A. Pelton,** who has been transferred to Terre Haute, Ind., to replace **W. B. Knight,** who has been transferred to Dennison, Ohio. Mr. Knight replaces **Norman Olsen,** whose promotion to assistant division engineer is announced elsewhere in these columns.

J. W. Harper, supervisor of track at Valparaiso, Ind., has been transferred to Philadelphia to replace **J. M. Minturn,** whose promotion to assistant division engineer is noted elsewhere in these pages. Mr. Harper is succeeded by **D. A. Sempsrott,** supervisor of track at Wheeling, W. Va. **R. F. Pitts,** supervisor of track at Erie, Pa., has been transferred to Rochester, Pa., to replace **E. E. Zacharias,** whose promotion to assistant division engineer is also noted elsewhere in these pages. **P. T. Trax,** assistant supervisor of track at New York, has been transferred to Union City, Ind., succeeding **Melvin Brown,** who has resigned. Mr. Trax is succeeded by **H. A. Sirabo. H. N. Lucas, Jr.,** junior engineer at Washington, D. C., has been promoted to assistant supervisor of track at Enola, Pa., succeeding **H. E. Simmons,** who has been transferred to Wilmington, Del., where he replaces **D. R. Wolfe.** Mr. Wolfe has been promoted to supervisor of track at Ashtabula, Ohio, succeeding **W. E. Hiltebeitel,** who has been transferred to Cape Charles, Va. **C. A. Beemer, Jr.,** supervisor of track at Fort Wayne, Ind., has been transferred to Carnegie, Pa., succeeding **C. G. Lybarger,** whose appointment as supervisor of safety is noted elsewhere in this issue. **W. J. Yahn,** assistant supervisor of track at Jamesburg, N. J., has been transferred to Alliance, Ohio.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Bridge and Building

The title of master carpenter on the Pennsylvania has been changed to supervisor of structures.

J. Thurman Roberts, track supervisor on the Southern at Danville, Ky., has been appointed bridge and building supervisor at Somerset, Ky.

M. Jackson Stevens, acting bridge and building master on the Moncton division of the Canadian National, has been appointed bridge and building master, with headquarters as before at Moncton, N. B., succeeding **C. M. Walker,** who has retired.

W. H. Yost, assistant supervisor of bridges and buildings on the Pocahontas division of the Norfolk & Western, has been promoted to supervisor of bridges and buildings of the Shenandoah division, with headquarters at Roanoke, Va., succeeding **M. M. Poindexter,** who has retired. Mr. Yost, in turn, has been succeeded by **C. G. Carbaugh,** acting assistant supervisor of bridges and buildings on the Shenandoah division.

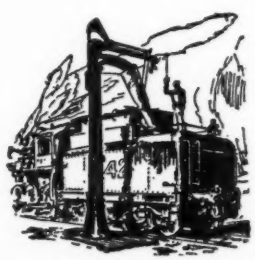
Special

C. G. Lybarger, supervisor of track on the Panhandle division of the Pennsylvania, with headquarters at Carnegie, Pa., has been appointed supervisor of safety on the Northern division, at Buffalo, N. Y.

Obituary

V. W. Phillips, roadmaster on the Norfolk & Western at Bluefield, W. Va., died on May 8.

William Lindsey, assistant roadmaster on the Pocahontas division of the Norfolk & Western, died recently.



Association News

American Railway Engineering Association

Three standing committees have scheduled meetings to be held in July. The Committee on Economics of Railway Labor will meet at the Mayo hotel, Tulsa, Okla., on July 10. On the following day this committee will inspect various maintenance-of-way operations on the St. Louis-San Francisco between Tulsa and Kansas City, Mo., via a special train which will be furnished by the Frisco. The Committee on Water Service and Sanitation will meet at the Engineers' Club, Chicago, on July 17, and the Committee on Iron and Steel Structures will meet at the Chippewa hotel, Mackinac Island, Mich., on July 18-19. The August meetings scheduled to date include that of the Committee on Wood Bridges and Trestles, to be held at association headquarters, Chicago, on August 20, and that of the Committee on Impact and Bridge Stresses, to be held at the A.A.R. central research laboratory, Chicago, August 28.

The June-July Bulletin (495) will be mailed to members near the end of July. This bulletin will contain three features, namely, an advance report of Subcommittee 6 of the Committee on Rail, on hold-down fastenings for tie plates, including pads under ties and their effect on tie wear; a further study of the behavior of floorbeam hangers, which is a description and an analysis of a static test made on a floorbeam hanger in a 124-ft. 2-in. pin-connected through-truss span on the Atchison, Topeka and Santa Fe; and a monograph by J. W. Carter, assistant professor of structural engineering, Purdue university, on Stress Concentration in Built-Up Structural Members.

Metropolitan Maintenance of Way Club

The annual outing of the club, which was held at the Out O'Bounds Aero & Golf Club, Suffern, N. Y., on June 21, attracted a crowd of 232 members and guests. In accordance with customary practice various sports and games had been arranged for the benefit of those present.

(Please turn to page 660)

Meetings and Conventions

American Railway Bridge and Building Association—Annual meeting September 17-19, 1951, Stevens Hotel, Chicago. Elise LaChance, Secretary, 431 S. Dearborn Street, Chicago 5.

American Railway Engineering Association—Annual Meeting, March 11-13, 1952, Chicago. Neal D. Howard, Secretary, 59 E. Van Buren Street, Chicago 5.

American Wood-Preservers' Association—H. L. Dawson, Secretary-treasurer, 839 Seventeenth Street, N. W., Washington 6, D. C.

Bridge and Building Supply Men's Association—L. R. Gurley, Secretary, 201 North Wells street, Chicago 6.

Maintenance of Way Club of Chicago—E. C. Patterson, Secretary-treasurer, Room 1512, 400 W. Madison street, Chicago 6.

Metropolitan Maintenance of Way Club—Secretary, 30 Church street, New York.

National Railway Appliance Association—Robert A. Carr, Secretary, 310 South Michigan avenue, Chicago 4; Lewis Thomas, Assistant Secretary, 59 East Van Buren street, Chicago 5.

Railway Tie Association—Annual meeting September 26-28, 1951, Netherland Plaza Hotel, Cincinnati, Ohio. Roy M. Edmonds, Secretary-treasurer, 912 Shell Building, St. Louis 3, Mo.

Roadmasters' and Maintenance of Way Association of America—Annual Meeting September 17-19, 1951, Stevens Hotel, Chicago. Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5.

Track Supply Association—Lewis Thomas, Secretary, 59 E. Van Buren street, Chicago 5.

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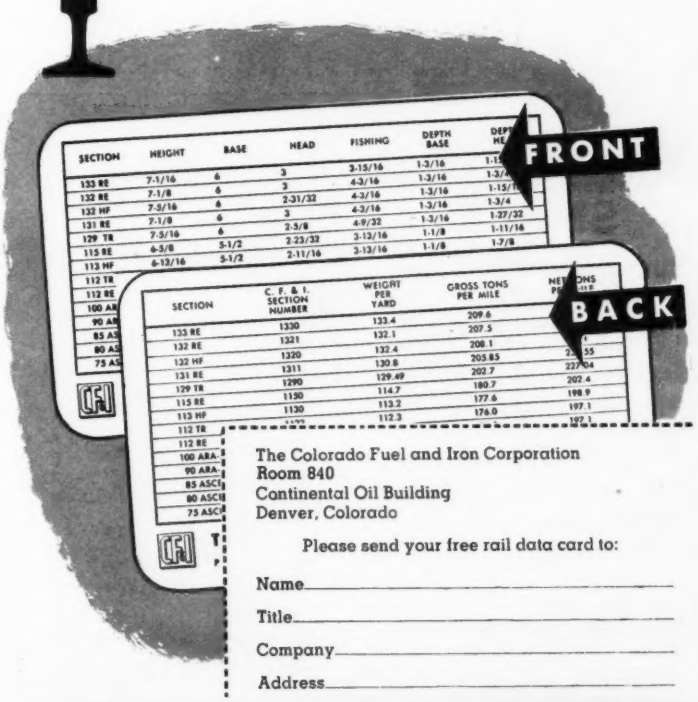

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Bridge and Building Association

Since the announcement was made in the June issue of the meeting of the Executive committee to be held at the Chicago Engineers' Club on July 23, the decision has been made by President Huckstep to continue the meeting the following day when a joint session will be held with the special committee that has been appointed to arrange plans for observance at the convention to be held on September 17-19 of the association's sixtieth anniversary. E. H. Barnhart, division engineer, Baltimore & Ohio, Garrett, Ind., and a past president of the association, is chairman of the Sixtieth Anniversary Special Observance committee. On both days the meeting will start at 9:00 a.m., Chicago Daylight Saving Time.

Supply Trade News

General

The dump-car, trailer-car and general car business of the **Austin-Western Company,** Aurora, Ill., has been transferred to, and will be operated from, the **Baldwin-Lima-Hamilton Corporation,** Eddystone, Pa. The assets of Austin-Western were acquired by the latter corporation on March 8, 1951. **Jess Mossgrove,** manager of the car department of Austin-Western will remain in charge of that department at Eddystone.

Personal

William E. Mott, has been appointed a sales engineer, Railway division, in the New York office of the **Timken Roller Bearing Company.** Mr. Mott joined the company as a railway sales trainee in February, 1950, after being graduated from Rutgers university.

J. L. Grant has been appointed chief engineer of the P. & M. Company, with headquarters at Chicago. Mr. Grant joined the company in October, 1918, and prior to his recent appointment as chief engineer, had served successively as draftsman, mechanical engineer and office engineer.

J. G. Wallace, formerly division manager for the Texas Company at San Francisco, Cal., has been appointed assistant manager, railway traffic and sales department, with headquarters at New York. **Walter E. Wilcox,** formerly assistant division manager at St. Louis, has been appointed division manager, railway sales division, at San Francisco. Mr. Wallace joined the company as lubricating engineer in 1924 and was advanced to division manager at San Fran-

(Continued on next page)

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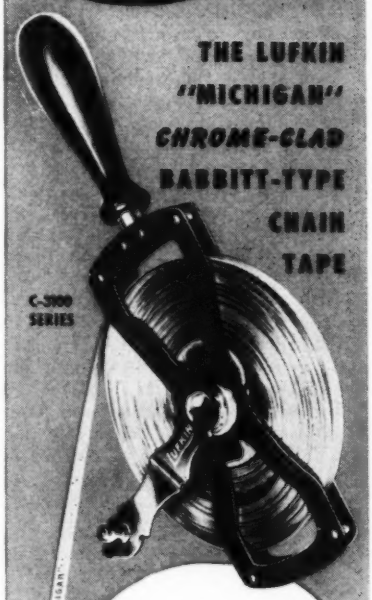

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cisco in April 1933. Mr. Wilcox joined the Texas Company in November, 1933, as lubrication engineer, and was appointed assistant division manager at St. Louis in February, 1945.

Kenneth I. Thompson, general sales manager of the **Oxweld Railroad Service Company,** a division of Union Carbide & Carbon Corp., at Chicago, has been elected also a vice-president and director of the **Canadian Railroad Service Company,** a unit of Union Carbide & Carbon. Mr. Thompson began his career in the industrial equipment business in 1921 with the Pennsylvania Pump & Compressor Co., and, before joining Oxweld, was in the sales department of the Ingersoll-Rand Company.

Kenneth I. Thompson

The Buda Company, Harvey, Ill., has announced the appointment of **Carl G. Meyer** as district representative handling the sale of Buda products to distributors and railroads in the Southeastern territory. He will have headquarters in Decatur, Ga. Mr. Meyers was formerly associated with the Towmotor Corporation and, before that, with the New York, Chicago & St. Louis.

Major W. McKean White, Jr., vice-president of the **White Manufacturing Company,** Elkhart, Ind., has been recalled to active military service. In the interim his duties with the company will be assumed by **W. McKean White, Sr.,** president and general manager.

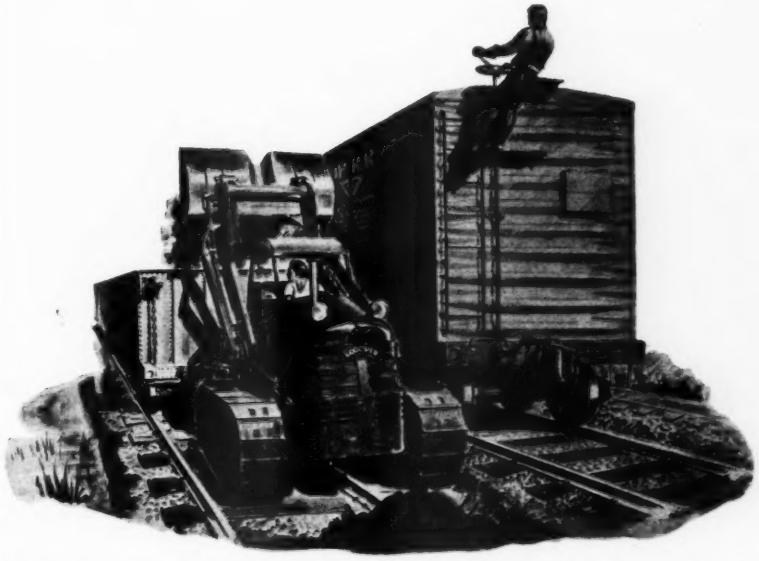
Trade Publications

(To obtain copies of any of the publications mentioned in these columns, use postcards, page 595.)

Hose Fittings and Line Oiler—Two new publications—the first in a series to supersede the Blue Brute accessories catalog—have been announced by the Worthington Pump & Machinery Corp. One of these, Bulletin H-1200-B44, gives sizes, parts numbers and applications of Blue Brute hose fittings, including hose nipples, union nuts, hose clamps, coupling spuds, reducing coupling spuds, spuds, reducing spuds, threaded pipe nipples, hose valves, and splicing nipples. The other, Specification Sheet H-1200-B45, pictures and describes the Blue Brute two-quart line oiler.

Chemical Brush and Weed Control—Data on methods and results in chemical brush and weed control as practiced by a wide range of industrial and agricultural organizations are outlined in a new "operations manual" now available from E. I. DuPont de Nemours & Co., Grasselli Chemicals Department. Included in the publication are cost data and evaluations of short-term versus long-range control programs. The manual is profusely illustrated with "before and after" pictures of brush-spraying operations. It is punched for insertion in standard three-hole loose-leaf notebooks.

Crawler Tractor—The International Harvester Company is offering a new catalog on the International TD-9 diesel crawler tractor. A two-color presentation, the catalog contains specifications and detailed information on how the TD-9 develops and applies its 40.5 drawbar horsepower. Photographs showing the machine at work appear in the publication along with information on construction and operating features. The catalog is designated as form CR-313-A.



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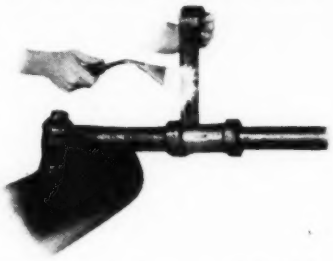

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